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X 17 RAF Barley Grey	18-B-21	X139 Light Grey	FS16495
X 18 NATO Green	BS285	X140 Light Grey	FS16622
X 19 RAF Rescue Yellow	BS356	X141 White	FS17875
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X 21 RFC Doped Natural Fabric		X143 Flint Grey	FS16314
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X 28 R. N. Helo. Olive Drab	BS298	X150 Canada	
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X 33 RAF 31 Sqd Mixed Green		X154 B-52 Dark Drab	FS14091
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X104 International Orange	FS12197	X203 Schwartzgrau Matt	RLM66
X105 Sand	FS13531	X204 Schwartzgrun	RLM70
X106 Insignia Yellow	FS13538	X205 Dunkelgrun	RLM71
X107 Radome Tan	FS13613	X206 Graugrun	RLM74
X108 Blue Angels Yellow	FS13655	X207 Grauviolett	RLM75
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X112 Olive Drab	ANA 613	X211 Dunkelgrun	RLM82
X113 Faded Olive Drab		X212 Litchgrun	RLM83
X114 Medium Green	FS14092	X213 Gelb	RLM04
X115 Field Green	FS14097	X214 Hellblau	RLM78
X116 Green Vietnam	FS14102	X215 Grun	RLM80
X117 Interior Green Matt	FS34151	X216 Silber	RLM01
X118 SAC Blue/Green	FS14159	X217 Rot	RLM23
X119 SAC Tan/Green	FS14201	X218 Dunkelblau	RLM24
X120 Green	FS14258	X219 Dunkelbraun	RLM61
X121 Gloss Sea Blue	FS15042	X220 Grun	RLM62
X122 Insignia Blue	FS15044	X221 Lichtgrau	RLM63



FW 190A by Tamiya. Decals: Aeromaster AMD48-006, painted with Xtracolor.

X222 Grun	RLM72	X379 F.A.R. Chamois	X613 MiG 29 Tan	East Germany
X223 Grun	RLM73	X380 F.A.R. Sable	X614 MiG 29 Brown	East Germany
X224 Sand Braun	RLM79a	X381 WWII Vert Emailite	X615 MiG 29 Lt Green	E. Germany
		X382 WWII Chocolat	X616 MiG 29 Dk Green	E. Germany
		X383 WWII Vert Tableau	X617 MiG 29 Tan	Czech
		X384 WWII Kaki	X618 MiG 29 Dark Green	Czech
		X385 WWII Vert	X619 MiG 29/23 Red/Brown	Czech
		X386 WWII Ombre Calcinee	X620 MiG 29 Light Green	Czech
		X387 WWII Terre de Sienne	X621 MiG 29 Underside Grey	Czech
		X388 WWII Gris Bleu Fonce	X622 MiG 23 Dark Green	Czech
		X389 WWII Gris Bleu Clair	X623 MiG 23 Green	Czech
		X390 WWII Gris Fonce	X624 MiG 23 Tan	Czech
		X391 WWII Vert Fonce	X625 MiG 23 U/side Grey/Blue	Czech
		X392 WWII Vert Fonce 2	X626 MiG 23 U/side Lt Blue	Czech
		X393 WWII Bleu de Nuit	X627 Nose Cone Grey	
		X394 WWII Chamois	X628 Wheel Hub Dark Green	
		X395 Mirage 2000 Light Blue Grey	X629 Interior Blue/Green Matt	
		X396 Mirage 2000 Dark Blue Grey		

GERMANY WWII			
X241 Topside Green			
X242 Topside Purple			
X243 Underside Blue			

LUFTWAFFE CURRENT			
X251 Gelboliv	RAL6014		
X252 Weissaluminium	RAL9001		
X253 Leuchtorange	RAL2005		
X254 Basaltgrau	RAL7012		
X255 Silbergrau	RAL7001		
X256 Grungrau	RAL7009		
X257 Steingrau	RAL7030		
X258 Staubgrau	RAL7037		
X259 Quarzgrau	RAL7039		
X260 Lichtgrau	RAL7035		
X261 Olivgrun	RAL6003		
X262 Schwartzgrau	RAL7021		
X263 Dark Grey	RAL7023		
X264 Graublau	RAL5008		

CIVIL AIRLINE COLOURS			
X301 Boeing Grey			
X302 KLM Light Blue			
X303 Federal Express Purple			
X304 British Airways Pearl Grey			
X305 Southwest Airline Desert Gold			
X306 British Midland Blue			
X307 Aer Lingus Light Green			
X308 Korean Air Blue			

GULF AIR FORCES			
X325 Lt Grey Kuwait A-4	DN9529		
X326 Sand Kuwait A-4KU	DN9530		
X327 Brown Kuwait A-4KU	DN9531		
X328 Lt Tan Abu Dhabi			
Hawk Mk63	FS10450		
X329 Sand Italian Tornado			

JAPAN WWII			
X351 Army Green			
X352 Army Grey			
X353 Navy Green			
X354 Navy Grey			
X355 Interior Metallic Blue			

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X376 O.T.A.N. Gris Bleu Fonce			
X377 Bleu de Mirage			
X378 Gris Aluminium			

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X502 Natural Steel			
X503 Oily Steel			
X504 Exhaust			
X505 Tyre Black			
X506 Gunmetal			
X507 Gold			
X508 Iron Black			

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X601 Su 27 Medium Blue			
X602 Su 27 Pale Blue			
X603 Su 27 Blue/Grey			
X604 Mil 24 Stone			
X605 Mil 24 Dark Grey/Green			
X606 Mil 24 Blue Grey			
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X608 Mil 28 Dark Green			
X609 Mil 28 Tan			
X610 Mil 28 Sand			
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X612 MiG 29 Grey			

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X409 Matt RLM 02 Grau			
X410 Matt German Field Grey			

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X804 Khakibraun	RAL7008		
X805 Dunkelgelb			
X806 Olivgrun	RAL6003		
X807 Schokoladebraun	RAL8017		
X808 Afrika K Tan Yellow	RAL8020		
X809 Afrika K Sand/Grey	RAL7027		
X810 Israeli Tank Sand Grey			
X811 Russian Tank Green			
X812 US Gulf War Armour	FS23446		
X813 Lt Stone Brit Gulf Arm	BS361		
X814 British Deep Bronze Green			
X815 British Mid Bronze Green			
X816 British Khaki Drab			
X817 British Dark Earth			
X818 German Tank Interior Cream			

VARNISHES			
XDG Gloss Varnish			
XDF Matt (Flat) Varnish			
XDS Satin Varnish			
XDGG Large Gloss Varnish	75ml		
XDFF Large Matt Varnish	75ml		
XDSS Large Satin Varnish	75ml		
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1:72nd
SCALE

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- 97 RAF: Sabre F.4 selection 1954-56 3, 4, 26, 66, 67, 71, 92, 93, 112, 130 Sqn. (see also sets 14 and 37 to complete RAF Sabre sqn. coverage). Phantom miscellany with items for 31, 43, 92, 111 Sqn. Dutch Air Force NF-5A 314 Sqn. Klu 75th anniversary 'Double Dutch' aircraft as in 1988.
- 98 RAF: Tornado F.3 choice between 11 Sqn. (incl. ZE764/DH with black spine and fin) 23 Sqn. and TOEU, also F.2 of ETPS all as in 1988. Jaguar GR.1A 2 Sqn. 1988 in 76th anniversary scheme with black fin containing large squadron badge. Dutch Air Force F-16A 312 Sqn. Klu 75th anniversary scheme as at 1988 air displays.
- 99 R.Navy: Wessex HAS.1/3 selection, 1962-82, 706, 737, 771, 772, 814, 815, 819, 820, 826 Sqn. and various Ships flights. RAF: Chinook HC.1 ZA671/EO 7 Sqn. 1989 in special 75th anniversary scheme. Lightning F.1A/3/6 56 Sqn. 1961 and 1976, illustrating first and final squadron schemes.
- 100 RAF/R.Aux.Af: Vampire selection F.3/FB.5/9 1950-57, 6, 20, 32, 118, 185, 213, 249, 501, 601, 602, 603, 604, 608 Sqn. Harrier GR.5 1, 3 Sqn. 233 OCU plus SAGEU 1989. Belgian Air Force CF-100 11, 349, 350 Sqn. 1958-1963.
- 101 RAF/R.Aux.Af: Vampire selection F.3/FB.5/9 1949-56, 16, 26, 28, 54, 60, 71, 72, 73, 98, 247, 502, 605, 607, 612, 613, 614 Sqn. Phantom FG.1 XV582/M 111 Sqn. 1989... the black one. Tornado GR.1/F.3 updates 1988-90 2, 9, 13, 25, 43 Squadrons.
- 102 British WW2 roundels, large types A:A1. Type A diameters: 65, 84, 100 inch. Type A1 diameters: 63, 64, 66 1/2, 77, 84, 100 inch.
- 103 British WW2 roundels, large types B, C, C1. Type B diameters: 60, 64, 75, 77, 84, 100 inch. Type C diameters: 77, 84, 100 inch. Type C1 diameters: 50, 56 inch. Sets 102 and 103 together contain 52 roundels and are a continuation of the ranges of small and medium size roundels included in sets Nos.39-42.
- 104 British mil/aircraft pre-war black and black with white outline serial letters and numerals 6, 8 inch. Also black 20 inch narrow style underwing type.
- 105 British mil/aircraft pre-war black serial letters and numerals 18, 20, 24 inch, in standard width styles.
- 106 British mil/aircraft pre-war black serial letters and numerals 30 inch, in both standard and narrow width styles.
- 107 British mil/aircraft pre-war 1918-1938 roundels. Diameters: 17 1/2, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 72 1/2, 80 inch. Total content 74.
- 108 RAF/R. Navy: Hawker Hart variants, 1932-1939, Hart, Hart(T), Demon, Audax, Hind, Hardy and Osprey aircraft depicted from 22 units.
- 109 RAF: Gulf War selection: Buccaneer S.2Bs XX899/P Laser Lips Laura, XX885/L Hello Sailor/Caroline, XW547/R Guinness Girl/Pauline, Jaguar GR.1s, XX733/R Biggles/Pink Spitfire, XZ367/P Debbie, XZ356/N Mary Rose, Victor K.2s, XH671 Sweet Sue/Slinky Sue, XL164 Saucy Sal, Tornado GR.1s, ZA452/GK Gulf Killer, ZD748/AB Alarm Belle, ZD748/ AK Anola Jay, ZA491/N Nikki, ZD739/AC Armoured Chamer, ZD890/O Hello Kuwait- G'Bye Iraq.
- 110 RAF/RN Gulf War selection: Buccaneer S.2Bs, XX895/G Jaws/Lynn, XV332 Dirty Harriet, Jaguar GR.1s, XX725/T Johnny Farparts XZ 358/W Diplomatic Service, Victor K.2 XM717 Lucky Lou, (also includes 55 Sqn. 75th anniversary marking). Tornado GR.1s, ZA465/FK Foxy Killer, ZA447/EA Mig Eater, ZD747/AL Anna Louise, ZD851/AJ Amanda Jane, ZD809/A Awesome Annie, ZD 847/CH 'Where do you want it?'. Lynx HAS.3s, XZ230/335-CF HMS Cardiff, XZ720/410-CC HMS Gloucester.
- 112 RAF Coastal Command 1941 to early 1950s, light slate grey 48" high by 30" wide squadron codes letters for use with numerals on set 111.
- 113 RAF Coastal Command 1941 to early 1950s, light slate grey alphabets and numerals for 18,24,30" high squadron codes including 30" characters in both standard and thicker stroke styles.
- 115 RAF: Hawk T.1/1As, XX249 4 FTS, 70th Ann. Scheme 1991/2, XX289 63 Sqn. (black fin) 1991/2, XX219 19 (Res) Sqn. (med blue fin) Sept.1992, XX329/C 151 Sqn. (blue fin) 1991/2, XX230 63 Sqn./XX281 151 Sqn. both in overall black schemes, 1992. Harrier GR.7, 233 OCU/20 Sqn June 1992 Tornado F.3 ZE253/AC F.3 OCU/56 (Res) Sqn. July 1992, including current fin emblem for 5 Sqn., Jaguar GR.1As, XX965/07 16 (Res) Sqn. 226 OCU 1992, also as OCU display a/c 1991 early 1992, XX970/EH 6 Sqn 1992, XX766/EA or EC 6 Sqn. DisplayA/C 1989 and 1992. Phantom FGR 2s 1435 Flt. Falklands late 1991. Army Air Corps Lynx AH.7 XZ221/J 654 Sqn. Desert Storm 1991, and silver Eagles Team aircraft.
- 116 RAF: Hawk T.1/1As, XX163 4 FTS/CFs, Solo Hawk Display a/c 1992, XX318 234 Sqn./1 TWU 75th Ann. Scheme with large dragon on black fin 1992, XX284/CL 100 Sqn. 1991, XX280 79 Sqn./1 TWU 1991, XX350 234 Sqn./1 TWU 1991, XX303 79 Sqn./1 TWU 75th Ann. Scheme with black fin 1992, XX157/B 92(Res) Sqn. with blue fin Sept.1992, XX255/TE 74(Res) Sqn. Sept.1992, XX226 74 Sqn. all black display a/c Oct.1992. Tornado F.3 ZG776/HN 111 Sqn. in 75th Ann. Scheme 1992, Ze342/HE 111 Sqn. in standard markings, GR.1A ZA372/E Sally T2 Sqn. Dhahran early 1991. Phantom FGR 2 XV408/Z 92 Sqn. all blue scheme as July 1991. Wessex HC.2 XR517/N 60 Sqn. July 1992 R.Navy Lynx HAS.3s a six a/c selection.
- 117 British WW2 roundels and fin flashes, South East Asia Command, Roundel diameters (standard): 16,32,48" Fin flash widths (standard): 16,22,34" Roundel diameters (non standard)32,35,40,48,50,54,56,63,66.5". Fin flashes (non standard): 24,36". Content 80 Roundels and 40 Fin flashes
- 118 WW2 British Pacific Fleet roundels and bars, plus white code letters and numerals; as used on FAA aircraft during 1945-6. (Two sheet set). Roundel diameters: 36, 54" . total 28. Codes heights: 12,18,24", total 370.

NOTE: To allow the maximum number of squadron options, many of our sets do not include roundels, fin flashing and serial numbering. The two former are intended to come from the relevant kits or MODELDECAL sets 54 and 107 and the latter from sets 33-35, 58-61, 104-106 all as appropriate. 'MODELDECAL' style fully illustrated sheet, giving decal locations, full colour scheme details and a selection of helpful photographs is also included with most sets.

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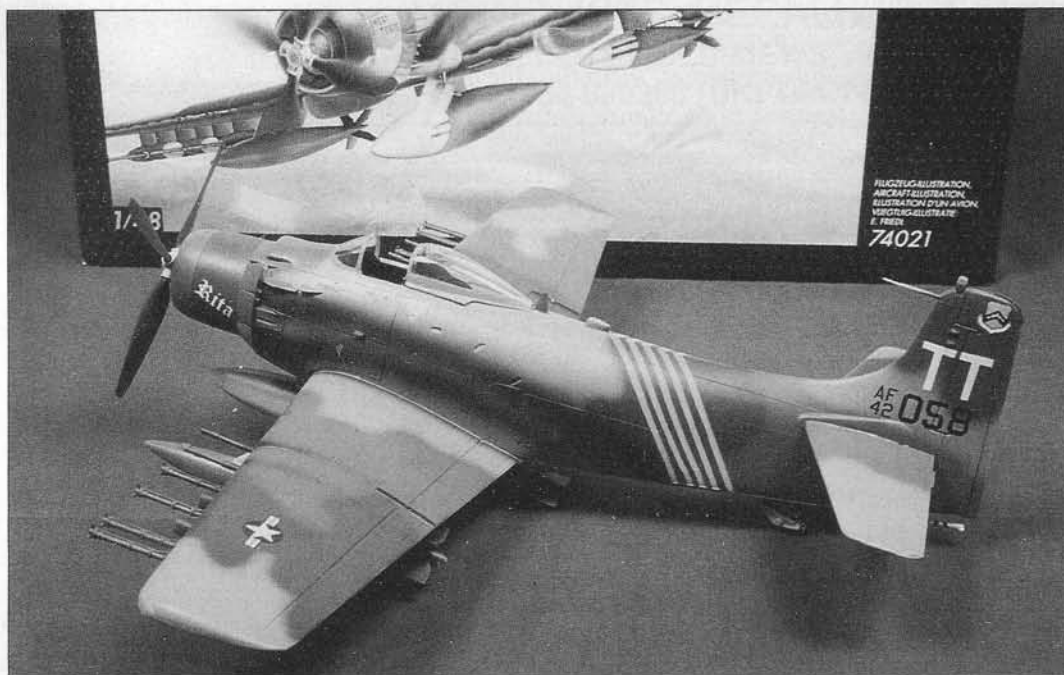
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New on the shelf . . .



DOUGLAS A-1 SKYRAIDER

reviewed by Richard Franks

Now if there was ever an ugly but functional aircraft award, the Skyraider must be in with a chance. Most people will of course think of it for its amazing ability to carry endless amounts of underwing ordnance during operations in Vietnam. It really is a brute of an aircraft but don't be fooled though as it is no slouch either, as anyone who has seen one fly at Duxford all agree.

This kit from Monogram has been about before, but it is always nice to see some kits available once again and this is certainly one of them. It is moulded in an olive green colour and consists of 76 parts plus three clear ones. The cockpit area is moulded as a tub with lots of nice detail. The instrument panels and side consoles are well done and will be enhanced by a spot of careful dry brushing. A pilot figure is included, but it's not something I include. Don't forget to fit the chin intake (part number 12) in stage 3, because you will have one hell of a job fitting it later. So speaks the voice of bitter experience! The wheel wells are boxed in via the very clever but simple use of sidewalls moulded complete with the

undercarriage doors. Note that the bulkheads fitted into the wing at stages eight and nine can be dispensed with as these were only necessary when a wing folding option came with the kit.

As I said, the A-1H always had a mass of stores under the wings and this kit has eight bombs, four rocket launchers, two napalm tanks and a centre line auxiliary drop tank. The undercarriage is excellent and the separate outer hubs certainly make painting each main wheel a lot easier. The exhaust stacks are well moulded, but don't bother to paint the engine insert (part number 8) as only the extreme tip is visible once it is in the cowl (part number 6). Final detail is that huge four-bladed propeller and the two-piece canopy.

Two Vietnam era schemes are given. The aircraft of the commander of the 56th Special Operations Wing at Nakhon Phanom, Thailand, November 1970 (with the name Rita on the nose) and a 1st Special Operations Squadron aircraft, 56th Special Operations Wing, also at Nakhon Phanom (this aircraft has the legend 'Blood, Sweat, Tears' on the cowl). The

colours referred to on the instructions are of course Revell's own paints and the mixes seem a little confusing. I opted for the Vietnam colours in the Xtracolor range. I used pale grey (X140) underneath, tan (X102), green (X116) and forest green (X110) on top. The blade aerial is dark grey (X129) and I used Humbrol aluminium 56 in place of Revell's own. All the colours were sprayed on, although card masks were used to reduce the 'feathered' effect. The bombs and rocket launchers are listed as matt NATO olive, and these were hand painted. The decals are matt and quite thick with a lot of carrier film to remove. I used AeroMaster's new decal solutions - Aero Sol and Aero Set - as these are stronger than Micro Sol and Set and they worked better on the thick Revell decals. As I went for the commander of the 56th Special Wing's aircraft, I had to apply those yellow fuselage stripes. This is a very involve job and having completed it I feel the method I used was incorrect. All I would say is remove the excess carrier film at the edges only, then apply the decal. Dry it off and after a short while start to cut out all the interior carrier film. After all this is complete you should still have parallel lines, unlike mine!

TECHNICAL DATA

Manufacturer: Monogram
Scale: 1:48th
Price: £7.95
Type: Injection moulded
Kit No: 74021

Once all was dry the whole model was sprayed with AeroMaster's 'Flat Clear' and heavy exhaust staining was sprayed down each side - after all, when was the last time you saw a photograph of a clean Vietnam Skyraider?

Overall a very good kit. It is moulded in detail and ease of assembly is very much a Monogram trade mark and I must say building this kit was different and enjoyable. Its ease of construction means that this is a kit I heartily recommend to all.

Thanks to Revell/Monogram for the review sample.

BOEING 377 STRATOCRUISER

reviewed by Brian Thorne

The original Welsh Model kit was that of a BOAC Stratocruiser with round windows. This kit is a reissue with excellent decals for the Northwest variant which, like some other machines, had rectangular windows instead of round.

With this kit, since it is a reissue, the fuselage is still marked out with indentations of the round windows so before starting work it is necessary to fill all these circular windows with filler and smooth it off. This is not a long job. It is worthwhile to rough around the windows a little so as to give a better surface for the filler to adhere to.

Since it is sometime since the earlier kit was issued it is worthwhile to recap on the kit. The whole kit is vacuformed with the exception of the metal undercarriage legs and wheels and a couple of DF loops. The



fuselage is split vertically, includes the fin and rudder, and is strengthened by four bulkheads. The wings are formed in left and right halves with top and bottom surfaces as are the tailplanes. Engines are split left and right and fit on to the fairing that is part of the wing.

Construction is straightforward after the parts have been

prepared. It is not necessary to file out any of the windows since they are all provided by the decals, but you may find it easier to file out the cockpit windows as this may be easier than cutting up the decals for this area into small pieces so as to fit smoothly around the curves of the nose. Weight is required in the nose to balance the model on its undercarriage.

Vacuformed propellers are provided and are usable but I feel it is more satisfactory to purchase a set of Aeroclub W016 metal propellers which also helps with the balance of the model.

The decals, for Northwest machine N74603, really are first class. They provide the dark blue cheatline, all the windows, and of course all the

TECHNICAL DATA

Manufacturer: Welsh Models
Scale: 1:144th
Price: £9.99
Type: Vacuform with metal parts

lettering and logos. The model can be quite colourful if the later Northwest scheme with white top to the fuselage is used but even with the earlier natural metal top the red fin and wingtips would make it look very smart. It appears that a slight error has crept in with the markings, however. N74603, fleet number 703 was, I believe, called *Stratocruiser Chicago* and later *Stratocruiser Seattle Tacoma* not *Stratocruiser New York* which was the initial name for N74604, fleet number 704. One for the purist which does not detract from the model.

A good kit, and more eye-catching than the earlier BOAC machine. Both, however, are excellent kits. I guess it is which side of the Atlantic you are as to which one you prefer.



MESSERSCHMITT Bf 110E-1

reviewed by Richard Franks

This is an aircraft which needs no introduction and the only thing many will want to know about this kit is the origin of the original toolings. To answer

the question, this is not a new tooling from Revell but the Monogram tooling. This may seem a bit of a let down, but be warned the Monogram kit is a

few years old now but it is still one of the best around.

The kit is moulded in a light grey plastic, which is quite soft, very much like the type used by AMT/ERTL. The kit consists of 43 grey and one clear piece. Construction could not be easier and I suspect many

TECHNICAL DATA

Manufacturer: Revell
Scale: 1:72nd
Price: £5.75
Type: Injection moulded
Kit No: 04341

will want to add more to the cockpit area. The kit only gives a 'pin and plug' type observer figure for the rear section and a seat and pilot for the front. There is no floor, control column, side consoles, rudder pedals, rear seat etc., so I am sure a lot of extra effort could be used in this area to very good effect. The fit of the parts is very good indeed and I used little filler, which is good as the panel lines are raised. The undercarriage bays are open, with no roofs and this is once again another area I am sure a little extra work will be expended on improving. It is nice to see the carriers and four SC 50 kg and two SC250 kg bombs are still included, even

though the carriers are moulded onto the wing under surface. There was quite a lot of flash on the mouldings as well as a lot of ejector pin marks, especially on the tail (part number 10) and the propellers (part number 30).

Two colour schemes are offered in the kit. These are: G9+IN of 5./ZG1 'Wespen', 1941 and U8+BB of Stab 1./ZG26 'Horst Wessel', 1941. Both aircraft are in a standard RLM 74/75/76 colour scheme, although the instructions identify each colour via complicated mixes of Revell paints. I went for G9+IN, just to see if the 'Wespen' nose decal would fit! All the colours I used were from the AeroMaster enamel paints range and all were applied with an airbrush. I used RLM 02 (9020), RLM 66 (9022), RLM 74 (9025), RLM 75 (9026) and RLM 76 (RLM 9027). Once dry the model was sprayed with gloss varnish in preparation for the application of the decals. As is the case with most Revell products of late, the decals are a little thick with quite a lot of carrier film visible. Each image is cut out and the carrier film at the edge of each is removed before each is dipped in water. A little Micro Set is applied and then the decal is slid into position and all excess water is dabbed off. After the decals settle, in about a minute or so, as much of the remaining film is removed. Once this tedious task is completed the model is once again sprayed with varnish, semi-gloss this time though.

Overall this is a simple but very good kit. I for one am pleased to see it back again and I am sure many modellers will be lining their lofts with this re-issued box! The ease of construction, coupled with the average detail make this a kit ideal for the beginner. The lack of detail is not a problem for the more advanced modellers, as I am sure they will want to add yet more to it anyway. Even though this kit is a few years old now, it is amazing to see the finesse of the crystal clear canopy is still the same, excellent moulding. My thanks to Revell (GB) for the review sample.



LOCKHEED F-117A NIGHTHAWK

reviewed by Richard Franks

The Lockheed F-117A stealth fighter needs little introduction nowadays, although a few years ago the Pentagon would be adamantly denying its existence. The whole stealth topic, once out in the open, lead to every manufacturer rushing off to tool up a kit of the F-117A. The result being many very inaccurate models! I am pleased to say that the more recent models have had the bonus of actual manufacturers' details and access to the real aircraft, all of which has added up to some very impressive kits.

This kit from Revell is not a revamped version, but an entirely new set of mouldings. The aircraft has the correct sweep angle, detailed bomb bay and undercarriage doors with the serrated edge. It will come as no surprise to most modellers that this kit is moulded in black, well what other colour would you use? The canopy of the full-size F-117A is tinted with real gold and this new kit even has all the cockpit area tinted in this colour. The glazing for the cockpit is moulded as one piece with the laser range finder cover, this whole assembly then clips up into the upper fuselage without the need for glue. For many, including myself, this is an excellent idea and one which should reduce the risk of marking the clear parts with any cement. However, for oth-

ers this may not seem so good, as it does mean that the canopy cannot be displayed in an open position. The cockpit area comes moulded in one piece and the instrument panel is supplied as a decal. A pilot figure is also included and as the canopy can't be opened I am sure many will wish to fit it. The bomb bay and undercarriage bays are moulded as one piece and this simply clips into the lower fuselage half. The wings and fuselage are goods fits and very little cement was required to secure them together. The bomb doors can be fitted either open or closed. The trapeze for each laser guided bomb is supplied, as are the two LGBs. The tail unit is moulded as one piece, to ensure you get their angle correct, and this slots into a hole in the upper fuselage. The unit will only fit one way and this therefore ensures you will not get it wrong.

Two colour schemes are offered, both of course being black overall. One aircraft comes from 49th Fighter Wing, based at Holloman AFB and the other is from the 37th Tactical Fighter Wing during detachment to King Khalid AFB during the Gulf War. The decals supplied in the kit still seem to be in matt finish, although they went on with little hassle. I went for the Gulf War aircraft as I had fitted the

TECHNICAL DATA

Manufacturer: Revell
Scale: 1:72nd
Price: £8.95
Type: Injection moulded
Kit No: 04333

LGB's and the decals included crew names and mission markings.

All in all this is an excellent new kit. Most of the detail is moulded on and the reduction in overall number of parts means that this is a model for all skill levels. I liked the model and am very pleased with the way it turned out.

My thanks to Revell (GB) for the review sample.

MORANE SAULNIER TYPE N

*reviewed by
Richard Franks*

The Morane-Saulnier Type N made its public debut just before the outbreak of World War 1, piloted by Roland Garros. The French *Aviation Militaire* was impressed with the Type N's performance and therefore ordered a small number. It was also a type which was later to serve with the RFC, albeit in relatively small numbers. The Type N had a 26 ft 8½ inch span and was 19 ft 1½ inches long, it was powered by a Le Rhône 9C 80 hp

rotary engine giving it a top speed of 90 mph at sea level and was armed with either a single 8 mm Hotchkiss, a .303 in Vickers or a .303 in Lewis machine gun. As no interrupter gear was available at this time the bullets from the machine gun were simply deflected off of the spinning propeller by armoured metal wedges. this system, although very 'Heath Robinson' in approach, seemed quite effective. It was invented by Roland Garros and they were referred to as 'Garros-wedges'.

The Czech company of Eduard are well known for their exquisite multi-media kits of World War 1 aircraft. following on from the last issue in 1:48th scale, the Sopwith Baby, they have now released the Morane-Saulnier Type N 'Bullet'.

Construction is dealt with via 13 stages, all of which are quite well illustrated in the instructions. Now I say 'quite well' as the complex nature of brass and the need to bend and position small parts are sometimes not helped by the vague nature of the instruction's illustrations. The entire cockpit interior is built up as an etched brass insert. You should note that the framework (photo-etched parts = 'PE') PE14 should be placed on a flat surface with the number '14' etched into it, uppermost, otherwise you will find that you have folded the entire thing back to front (yes, I did that!). I did not like the use of metal pins for the control column and linkage, I would therefore recommend that you replace these parts with wire or plastic rod. The interior is not bad to make up, although very

fiddly, but I must say that rolling the rotary engines rear mount (PE50) was very difficult. In the second stage of assembly I did not fit the engine mounting pin (plastic parts = 'PP') PP11, as I intended to fit the engine after I had secured the cowl.

A little bit of cleaning up is required in the fuselage halves before assembly, mainly the removal of the ejector pin marks. Don't forget the side-wall detail, which is supplied as etched brass, but also note that the PE numbers quoted on the instructions are back to front, they should be PE35 fitted to fuselage PP1 and PE36 is fitted to PP2. You have to drill out holes for the wings and undercarriage legs, although the location of each is indicated by a small indentation in the plastics surface.

Once the fuselage was dry, I secured the wings with a dab of superglue, then aligned them, before finally securing them with liquid cement. The



TECHNICAL DATA

Manufacturer: Eduard

Scale: 1:48th

Price: £11.95

Type: Limited run injection moulded plastic with white metal, etched brass and decals

Kit No: 8010

Plastic parts: 15

Etched parts: 83

White metal: 1

Metal tubing: 4 lengths (plus 3 pins)

Acetate sheet: 3 instruments and windshield

Decal options: 2 (c/w colour painting guide)

tailplane and rudder were approached in the same manner, although a little bit of adjustment was necessary on the rudder (PP9). The engine cowl (PP13) is a bit of a poor fit, it is lopsided when fitted to the fuselage. The way to sort this out is to sand the lip on the fuselage a bit deeper on one side, then re-test the fit. Once it settles down and fits a little more snugly, glue it in position. The 'Garros wedges' (PE23) are a little fiddly and I would advise you to leave them until you have positioned the machine gun. The tail skid is quite well executed, as are the main undercarriage legs. The etched parts for the outer part of each strut (PE10) are meant to replicate the bungee cords used for suspension in this type of aircraft. I decided against their use, preferring to make up the undercarriage and then wrap each end with cotton. This is a better representation, I think, than the etched pieces. The construction of the 8 mm Hotchkiss machine gun is again

very fiddly, it is difficult to curve PE39 into shape and PE27 does not fold up very well. I suspect most of my problems were simply due to size of my hands, I am not designed for such delicate work! Now most of the assembly was completed so I left off the cockpit windshield, machine gun, propeller and rigging to allow me to apply the overall colour scheme.

As stated in the technical data box, the kit comes with two colour scheme options and a beautiful A5 size colour painting guide. The two options are: MS393, Escadrille MS.12, flown by Jean Navarre, 1915 and MS394, probably Escadrille MS.12, 1915. Both aircraft are natural linen overall with a red forward fuselage, spinner and wheel centres, MS394 also has red lines down the lacing line of the fuselage, with French colour (blue, white, red) between them. No colour references to manufacturers paints are given within the instructions so you may



wish to use the 'Linen' colour in the Humbrol range. I, however, decided that it is possible that a French aircraft of this era may well have 'continental' fabric and if this was the case, cream would be a more likely colour (alright I did not have any 'Linen' left!). The cockpit area was first sprayed a 'natural wood' colour from the old Humbrol Authentic range and once dry the forward fuselage, etc. was masked off with tape and the cockpit filled with damp tissue paper. Once the main of the aircraft was cream, and it had dried, the masking was reversed and the nose etc. was sprayed red. It is not a deep red – not Post Office red – so I decided to use World War 2 Luftwaffe Rot RLM 33 (Xtracolor), as it seemed the closest to the colour on the instructions.

Once all this was dry the masking was removed and the rigging holes were drilled out in each wing. The decals have to be applied before you rig the aircraft, otherwise you will never get the roundels in place. There are very few decals for each aircraft, just four large roundels, rudder stripes, a set of tail codes, propeller motifs and, if you do MS394, those fuselage stripes. I found the kits decals excellent and found there was no adverse reaction to either Micro Sol/Set or to AeroMaster's Aero Sol/Set solutions. The final task was to add all the detail parts, such as the machine gun and to line up the 'Garros wedges' on each propeller blade, before I commenced rigging the model. The instructions are not very clear on the route of each piece of rigging and I could attempt to

identify it via a narrative report here, but it would only make you even more confused, so I will leave it up to you to decide, just like I had to. Many hours later – but seriously, it did not take that long – the final piece to be added were the exquisite Morane-Saulnier manufacturers' badges on each side of the engine cowl (PE20). These should be pre-painted either red or blue and once dry, lightly sanded. This will remove all the paint off the raised lettering and leave you with excellent little logos to add to your model, a real 'finishing touch'.

Overall this is an excellent kit. I am glad to see the use of a metal engine instead of the plastic ones seen in some of their other kits. I must admit that making this kit was only easy in places for me and it

highlighted two things: my hands are too big for this type of model and I do not have the temperament for fiddly, delicate models!

However, if you like World War 1 era aircraft and can therefore hack all this fiddly rigging and stuff, I am sure you will love this kit. My thanks to Stan Overall of Four Plus (UK) for the review sample. All Eduard products can be obtained direct from them at the following address: Four Plus (UK), 29 Westwood Gardens, Hadleigh, Benfleet, Essex SS7 2SH.

Eduard products are also available from other specialist hobby shops, although the price quoted in the technical panel accompanying this article is from Four Plus and you should add an additional £1.00 towards post and packing.



FOCKE WULF FW 190S-5 or S-8

reviewed by Richard Franks

The debate as to the real use of the two-seat Focke Wulf FW 190 has continued for years; many believe it was a trainer and others say it was a high speed VIP and liaison aircraft. Both suggestions are theoretically correct as field modified versions, identified as a FW 190A-5/U1 or A-8/U1, were produced, and a factory converted example, either based on the A-8 or A-5 airframes (S-

8 or S-5) was considered. The Focke Wulf factory never undertook series production of a two-seat FW 190 – they did however, produce drawings for modification kits. Some airframes had previously been converted to two-seat configuration in the workshops of the Jagdfliegerschule (fighter pilot school) at Altenberg and it was on this work that Focke Wulf based their conversions. By the

time these were available however, some 58 aircraft had been converted at Altenberg, so the

manufacturers decided not to run a series of conversions on older airframes.

What this new conversion from Hannants' Xtraparts range offers is the chance to build one of the proposed S-5 or S-8 trainers. I should also like to point out that this set could be fitted to a Trimaster or Dragon FW 190F-8, to create a replica of the world's only surviving two-seat FW 190; W/Nr 584219, which is displayed at the RAF Museum, Hendon. The conversion itself could not be easier, as it has been designed along the same lines as the original conversion was. There is no new fuselage, instead, just a new rear cockpit insert, a rear upper decking, side strakes, instrument panel and control column, all of which are supplied in resin. The set is completed with both styles of cockpit canopy in vacuformed clear plastic.

TECHNICAL DATA

Manufacturer: Xtraparts
Scale: 1:48th
Price: £6.75
Type: Resin and vacuformed plastic conversion
Kit No: XP48-046
Resin parts: 6
Vacuformed: 2
Based on: Dragon FW 190A-5 or A-8
Kit No: D5502 or D550
Kit Price: £26.50

Conversion itself is very simple: just cut out the canopy sill parallel with the front portion to make an enlarged cockpit area. The fuselage is then made up as per the kit instructions. Once made up, the new rear resin cockpit is inserted in from underneath, behind the complete forward cockpit (kit instruction stage one). The new upper decking will now be added to the rear fuselage, positioned to line up with the rear edge of the new aft cockpit insert. Quite a bit of cutting is required to remove the resin pouring point from this upper decking – however, it all looks a lot worse than it actually is and I had no problems with mine. The only other things to do are the positioning of the rear cockpit instrument panel and control column, which is followed by the fitment of the appropriate cockpit canopy and side strakes. I decided to display my model with the canopy open, so I separated the windshield from the rear section and secured it in place. I then separated the front and rear opening sections from the fixed middle section, which was then secured in place. A nifty bit of masking is required to cover the fixed canopy sections and the open cockpit, but I used a combination of masking tape and Parafilm M for mine.

You can make all the rest of the kit as per the instructions, noting that centreline carrier or gunpack on the A-5 are not required. As far as a colour scheme goes it is very much up to research on your part. My example is not based on any real aircraft, instead it is simply representative of the type. I used a combination of RLM 76 Lichtblau underneath, with RLM 74 Graugrün and RLM 76 Grauviolett on the upper surface and a mottle of RLM 81 Dunkelgrün on the fuselage sides and tail. The decals all came from the AeroMaster range; the fuselage and wing crosses came from sheet number 48-022 'Focke Wulf FW 190A-F Early national insignia', the swastika's came off sheet number 48-026 and the fuselage code came off the Luftwaffe ID sheet number 48-048. All the stencilling on the model came

ACCESSORY REVIEW

1:144th SCALE DETAIL FROM AIRFIELD ACCESSORIES

The Folkestone based company of Airfield Accessories may sound new to many, but it has been around for a year or two now. Initially they offered 1:48th scale multi-media kits of vehicles, etc. you were likely to see on an airfield. These were mainly RAF and Luftwaffe topics from the Second World War and they were soon joined by more examples in 1:35th and 1:72nd scales.

With the re-issue of many old Crown kits in 1:144th scale by Academy, Airfield Accessories founder Mike Oakes decided to produce some white metal cockpit inserts. There have always been kits in this scale, so the range was enlarged to include those kits tooled by Hasegawa. After Dragon's flirtation with the scale, Revell decided to intro-

straight off the kit's decal sheet.

Overall this a simple and well produced conversion. I was very pleased with my model, although one day I must really set about doing one in 1:24th scale! This conversion is relatively cheap at £6.75, although Hannants' minimum order regulations will mean that you cannot mail order it on its own; mind you, who needs an excuse to spend more in a model shop? The other problem is the cost of the basic kit – at £26.50 it is not inexpensive and even more annoying is the fact that the A-8 has recently been deleted by Dragon (hold on though, as it may be back from Hasegawa soon?). I do wonder if this set would fit into the new Tamiya kit?

A very simple and nice conversion. My thanks to Nigel Hannant for the review sample. It can be purchased from them at Hannants, Trafalgar House, 29-31 Trafalgar Street, Lowestoft, Suffolk NR32 2AT or from selected specialist hobby shops.

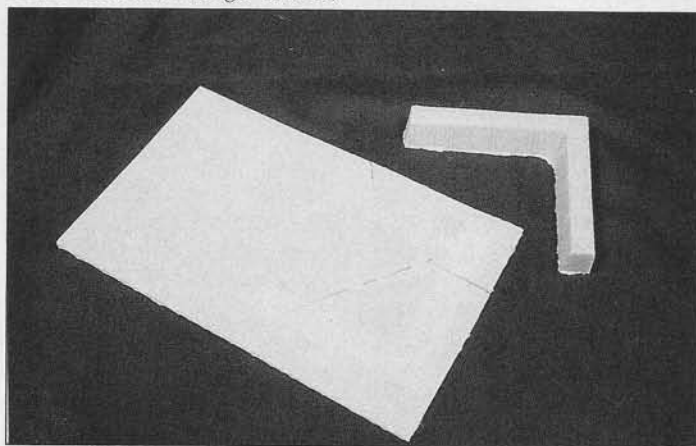


An idea of the size and detail in some of these 1:144th scale cockpit inserts; the coin is a 1p piece!

duce kits in this scale and these too have now been covered in the range. Many of you may be aware that the 1:144th scale Crown kits had little or no interior detail, the same can be said for many of the others, so these new metal inserts should fill any of the gaping chasms in your model. The number of inserts involved is very large, so I will simply list them in numeric order:

144.01 Hawker Hurricane £0.50 R, 144.02 Supermarine Spitfire Mk.I £0.50 R, 144.03 Hawker Typhoon £0.50 R, 144.04 Hawker Tempest £0.50 R, 144.05 Grumman F6F-3 Hellcat £0.50 R, 144.06 P-47D Thunderbolt £0.50 R, 144.07 P-51B Mustang £0.50 R, 144.08 F4U-1 Corsair £0.50 R, 144.09 Messerschmitt Me 262A £0.50 R, 144.10 Focke Wulf FW 190A £0.50 R, 144.11 Messerschmitt Bf 109E £0.50 R, 144.12 Junkers Ju 87B £0.50 R, 144.13 B-25H/J Mitchell £0.70 R/A, 144.14 B-26B Marauder £0.60 A, 144.15 Heinkel He 111H-6 £0.70 A, 144.16 Junkers Ju 88A4 £0.70 A, 144.17 B-29A Superfortress £0.80 A, 144.18 B-24J Liberator £0.80 A, 144.19 Messerschmitt Bf 110 £0.0 A, 144.20 Grumman Avenger £0.70 A,

144.21 Avro Lancaster £0.60 A, 144.22 Kawasaki Ki 45 £0.60 H, 144.23 Kawasaki Ki 48 £0.80 H, 144.24 Mitsubishi Ki 21 £0.90 H, 144.25 Mitsubishi G4M1 £0.90 H, 144.26 A6M2 Zero £0.50 A, 144.27 Spitfire Mk.V with Vokes Filter £0.60 A, 144.28 P-51D Mustang £0.50 A, 144.29 Lockheed C-130 Hercules £1.95 R, 144.30 BAC Lightning F.6 £0.50 R, 144.31 A-10A Thunderbolt II £0.60 R, 144.32 EA-6B Prowler £1.10 R, 144.33 A-6 Intruder £0.70 D, 144.34 Mil-2 £0.70 D/L, 144.36 F-4E Phantom II £1.00 A, 144.38 F-111A Aardvark £1.00 A, 144.40 Jaguar £0.60 A, 144.42 MiG-25 Foxbat £0.70 A, 144.43 SAAB Viggen £0.70 A, 144.45 Mirage F.1C £0.60 A, 144.46 F-16A Falcon £0.60 A, 144.47 MiG-21 £0.60 A, 144.48 MiG-23 £0.60 A, 144.49 MiG-27 £0.60 D/L, 144.50 F-104G Starfighter £0.60 A, 144.57 Ju 52-3m (military conversion) £2.10 W, 144.58 Aichi D3A1 £0.80 A, 144.59 Nakajima Type 2 £0.60 A*, 144.60 Nakajima B5M2 £0.80 A*, 144.61 Ki 43 Oscar £0.60 L*, 144.62 Ki 84 Frank £0.60 L*, 144.63 P-3F Orion £2.10 L, 144.66 Tornado IDS £1.40 D/L, 144.67 Sukhoi Su-27 Flanker £0.80 D/L, 144.68 MiG-29 Fulcrum £0.80 D/L, 144.69 F-14A Tomcat £0.90 D/L, 144.70 F/A-18A Hornet £0.80 D/L, 144.71 F-16 Falcon £0.80



1:144th scale World War 2 aircraft hardstanding by Airfield Accessories.

D/I, 144.72 F-15C Eagle £0.95 D/I, 144.73 AH-64 Longbow Apache £0.80 D/I, 144.74 Mil-28 Havoc £0.80 D/I, 144.75 AV-8B Harrier II £0.80 D/I, 144.76 Su-22M Fitter £0.80 D/I, 144.77 Eurofighter £1.00 R, 144.78 SAAB JAS-39 Gripen £1.00 R, 144.79 Northrop F-5E Tiger II £0.90 R, 144.80 F-117A Stealth £1.10 R.

Key: R = Revell, D = Dragon, M = Matchbox, A = Academy/ARL, I = Italeri, W = Welsh Models, L = LS, * = Item due for release in 1995.

To go along with these were two resin display bases, also in 1:144th scale. The first is 144.64 'World War 2 Aircraft Revetment Area' and the other is 144.65 'Modern Aircraft Hardstanding Area'. Each of these is a simple resin base with moulded details such as grass and stone slab effect, whilst the WW2 revetment has the grass and wooden protective barrier moulded as a separate piece. This allows you to position it where ever you want to achieve the prospective you require. Both items are priced at £4.95.

As a modeller who finds 1:144th scale just too small, I must say that I would probably find the cockpit inserts a real benefit. However, although I appreciate that white metal is not a cheap material, the price of each insert strikes me as a little high, considering what you get and how little everything is. This is a personal viewpoint and in no way should it stop you from at least checking out this range if your chosen topic is 1:144th scale aircraft. The resin base boards seem a good idea, but once again a relatively expensive one. Again, resin is not a cheap media to produce or purchase, so this is probably why they cost this much. One point I would raise with the manufacturer is, please ensure that the base boards are well packaged, as my examples had been got at by the postal service and each came in about five pieces!

Overall I commend Airfield Accessories for their venture in this scale and I am sure it is already appreciated by those of you who work in this scale. The bases do not appeal to me (another personal view-point!), but I am sure that it beats scratchbuilding them.

All of the above can be purchased direct from the

manufacturer at: Airfield Accessories, 171 Canterbury Road, Folkestone, Kent CT19 5PA. Telephone (01303) 24395 (pm only).

Post and packing costs are 10 per cent of the order value (up to £30.00). Payment should be by cheque, postal order or Eurocheque made payable to Mr M.A. Oakes.

Richard M. Franks

THE LATEST FROM AIRWAVES

Today there are many manufacturers offering etched detail parts for your latest creation. However, in the beginning (doesn't that sound like the start of a biblical epic!) there were very few and one of the first, in the UK at least, was Airwaves. This company, an offshoot of ED Models, has offered numerous etched detail sets for a few years now and although initially concentrating on only aircraft, they have since moved into armour. Recently ED Models sent their latest aviation offerings to the editorial office, so here is the review.

I have four sets, all to 1:72nd scale; one for a British type, two for German types and one generic - all, however, are World War 2 era subjects.

The first of my sets is for the British type, the Westland Whirlwind fighter; isn't it funny how we have to say 'fighter', what other whirlwind was there apart from that flying food processor? Back to the review and off topics which lead to a very full mail bag of complaints arriving on the editors desk. This set, AC72143, is designed for the Airfix kit (or SK packaging if you have it, or any other Eastern Bloc repackaging if you come to mention it). The fret consists of 25 pieces as follows: cockpit floor with sidewalls and instrument panel, throttle box, rudder pedals, seat belts, access ladder, radiator front inserts, upper wing detail and lower wing detail.

The quality of the brass and detail thereon is not bad, although I must say that the radiator front detail is very plain, and hardly worth

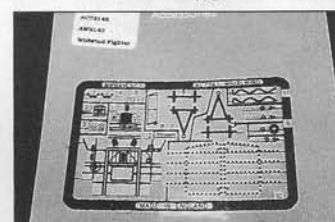
adding, whilst the detail on the instrument panel is most commendable. The old Airfix kit, although revised, can still do with a little bit of extra detail. I would have hoped for something a little more ambitious though, maybe some flap detail, etc., however overall this is a sound basic set which will add a lot to your finished model.

The next set, AC72144, is in fact one of a pair, both of which are for one of my favourite Luftwaffe types. Both this and the next example are for the Messerschmitt Bf 110G-4 and are designed for the new Italeri kit. This set concentrates on the cockpit area and consists of 48 pieces. Seat belts and cushions are included along with a new instrument panel and side console detail. The rear cockpit gets new side wall detail and radio equipment, plus the rear MG 81Z gets a full set of sights. I cannot comment on the coaming above the instrument panel, part number 24, as the example at Hendon certainly does not have any fitted. But I am pleased to see the inclusion of the framework behind the pilot's head, always a highly visible but often missed detail on a 'G' series Bf 110.

Following AC72144 comes AC72145 and this deals with the exterior of Italeri's Bf 110G. This set consists of no fewer than 62 pieces. The parts include lovely detailed screens for the ends of the exhaust pipes, trim tab actuators for the fin end plates and an IDF and trailing aerial. Blanking plates for the coolers under each engine are included which is a nice touch to eliminate that horrible 'see-through' effect. Counter balance weights for the ailerons are included, although I would add some additional shape to the weights as they look rather odd flat. The release strop for the drop tanks is included as is a large number of ribs and detail for each undercarriage bay. A blanking plate for the front of each undercarriage bay is also included as well as one for the air intake on the leading edge of the port wing. The final touch is the inclusion of the deflector plate which was fitted aft of the SN-2 nose



Above: Bf 110G Exterior Set.
Below: Whirlwind fighter.



Above: German WW2 seat and components. Below: Bf 110G cockpit set.



antenna to ensure the safe passage of ejected cartridge cases on the starboard side of the nose. This is a good set and in conjunction with the previous one I am sure it will add a lot to any Bf 110, I know it will to mine! It is nice to see an etched manufacturer *not* attempting to make tubular aerial posts in two-dimensional etched brass; well done Airwaves.

My final offering is the generic one. AC72146 is entitled 'German WW2 Seat and Component Set' and it basically consists of seats, seat belts, cushions, rudder pedals and gun sights. There are 71 pieces on the etched fret, these being: 4 x seats, 8 x machine gun sights, 5 x prismatic gun sights, 4 x sets of rudder pedals, 5 x sets of seat belts and 4 x styles of seats c/w cushions.

This is a good set and one which will grace anybody's 'necessity' category in the spares box.

Overall all of these four sets offer sound basic detail without any fancy and often unnecessary 'gimmick' items. I

am sure that the generic set will be welcomed by many and I hope the Whirlwind and Bf 110G sets also prove popular.

My thanks to Andrew Deeley for these review samples. All Airwave products can be obtained from specialist hobby shops or direct for ED at 64 Stratford Road, Shirley, Solihull, West Midlands B90 3LP. Telephone 021-744 7488.

Richard A. Franks

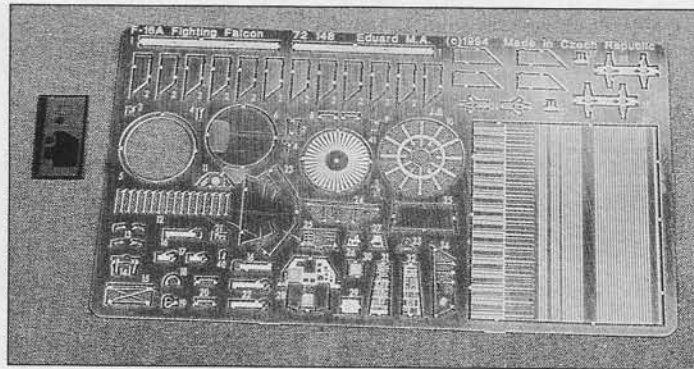
NEW FROM EDUARD

It is always a pleasure to hear from Stan Overall of Four Plus UK and no more so than when he supplies me with a few review samples (telling indication of my nature!). This was the case recently when I received five such sets, two of which are in 1:72nd scale, whilst the other three are in 1:48th.

The first of the 1:72nd scale sets, number 72-139, is for the bomb bay of the B-25 Mitchell. Designed for the Italeri kit, the set consists of three frets, one 7

by 9 cm, another 4.5 by 6 cm and the final one 2.5 by 3 cm. The main fret contains the bays upper roof, side walls and bomb bay doors. Whilst the second and third frets contain side wall detail, bomb cell dividers, etc. There is a little cutting of the kit parts required to fit the etched parts in place – however, it is relatively easy and all of it is well illustrated in the instructions. The Italeri kit is nice enough to start with but the addition of an open bomb bay will be very nice: anyone got any good US GP bombs in 1:72nd scale?

Next is set number 72-148, for the F-16A Fighting Falcon, and it is intended for the Hasegawa kit. Only the one fret this time, but it measures 6.5 by 11.5 cm and comes with an acetate film backing for the new instrument panel fascia. The fret contains 83 parts and these cover the ejector seat, cockpit interior, canopy and HUD, wing pylon and missile launcher, AIM-9L missiles, exhaust cones plus various external aerials, etc. The ejector seat and cockpit interior detail



Eduard 1:72nd F-16A detail set.

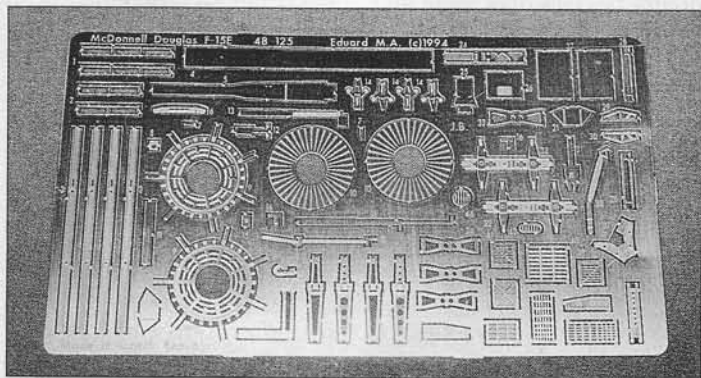
are welcome, as is the new HUD frame, but I cannot help but feel that the new forward cockpit coaming is a little unnecessary. Wing pylons and missile rails always look devoid of detail in most injected kits, so the bits and pieces in this set will be very useful. I must say that the instructions for the new exhaust cone detail look very involved and I therefore cannot comment on how successful you would be with it (I would certainly make a mess of it). Although the F-16A is just another 'grey' aircraft, it is still popular and I am sure the addition of this set to any model will make it really stand out.

Now onto the 1:48th scale offerings. The first, set number 48-099, is a set of flaps for a Spitfire IX. Designed for the ARII kit, although the header card says 'for Hasegawa kit' (do they know something we don't?), the 6 by 5.5 cm fret contains the replacement flaps, internal ribs and even the actuator arm and door. The set is similar to the previous offerings from Eduard, although the etch is of course modified to suit the appropriate kit. I have used the Mk.V set on a model and was surprised by how relatively simple it all was and how good the model looks with the flaps down. Only things to watch are the need to fit a plastic rod to the inside/back edge of the main flap and the need to drill and cut a square hole in the top of each mainplane for the actuator arm to protrude out of. Other than those points this is an excellent and simple way to detail the ARII kit, it is therefore a pity that the kit is well known for its total lack of gull-section to the wing!

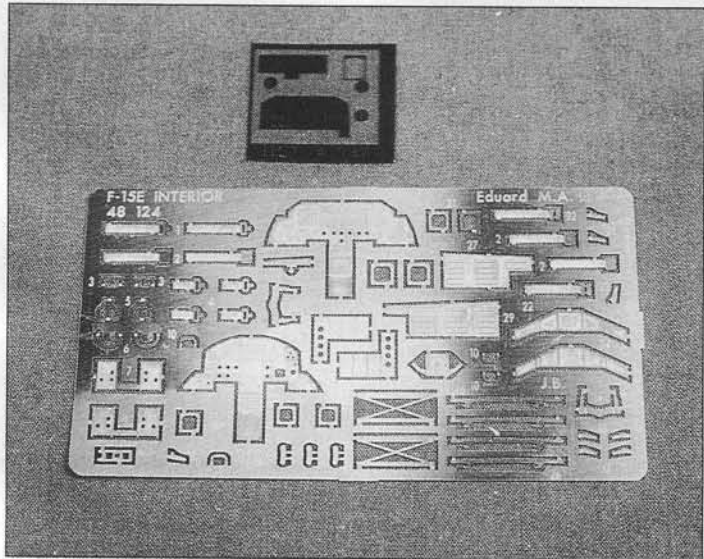
Back to a slightly bigger detail set now, for another

modern aircraft type. Set number 48-124 is for the F-15E Eagle's interior and is designed for the Hasegawa kit. Measuring 5 by 9 cm the fret contains 63 pieces and also comes with acetate backing for the new etched instrument panels. Detail is added to the cockpit interior, ejector seat, canopy and HUD detail being restricted to the interior means you get all the usual bits and pieces and I am sure there must logically be an F-15E exterior set to compliment this one. Again this is another 'grey' aircraft to me, but I am sure that this set coupled with one for the exterior will add quite a lot to anyone's completed model.

Well what do you know, having said I suspect there is an exterior set to the above one, here it is (OK, OK, I knew all along). Set number 48-125 is for the exterior of the F-15E Eagle and is of course also meant for the Hasegawa kit. I now see why there is an exterior and interior set, as this one is big. The fret does in fact measure 13 by 7 cm and contains 73 pieces. The detail offered covers the tail hook, engine fronts, boarding step, AIM-9L missile rail, wing pylons, nosewheel well, nose undercarriage strut, main undercarriage strut, plus various panels and louvred vents for the upper and lower surfaces. The parts count is quite impressive and so is the scope of the set. The cut out for the tail hook may be a little tricky to do, but worth the end result (I think!). The engine fans are always a boon in etched brass and I suspect a boarding ladder will add a lot to a model displayed on a diorama. The inclusion of separate surrounds for the formation strip lights is a very good idea and



Two etched brass sets for the F-15E Strike Eagle from Eduard: Exterior set (48-125). Below: Interior set (48-124).



should add a neat look to your model once installed over the kit's decals. The final addition of all the various louvred panels will add a little subtlety that is not possible with injected plastic. Do not forget to back the rear of each panel with some black plastic card other-

wise these areas will instantly become 'see-through'.

Overall, the above sets are excellent, yet more examples of the superb quality offered by Eduard. The diversity of topic and speed at which the sets appear on the market only go to reinforce their obvious com-

mitment to the hobby. With Eduard branching out into decals and multi-media kits I can only hope that Four Plus UK are pretty busy of late.

The sets reviewed are priced as follows: 72-139: £4.95, 72-148: £6.45, 48-099: £3.95, 48-124: £4.95 and 48-125: £5.95.

My thanks to Stan of Four Plus for the supply of the above review samples. All Eduard products can be obtained direct from him at Four Plus UK, 29 Westwood Gardens, Hadleigh, Benfleet, Essex SS7 2SH.

Richard A. Franks

SCALE ORDNANCE FROM PP AEROKITS

It seems to be all the vogue at present to produce 1:48th scale bombs and rockets. I have already seen the test shots of the examples manufactured by Hi-Tech which will be marketed under both their own and AeroMaster's labels, however, I became aware of this excellent set from PP Aerokits late last year.

The set consists of bombs and rockets, for the World War 2 and 1950s era in RAF and Royal Navy service. The set AC420 is entitled RAF and RN Bomb and RP Set and it consists of the following: *etched brass*: 60 lb rocket fins (48), 1,000 lb bomb fins (8), 500 lb bomb fins (8), bomb shackle (12) and bomb fuse vane (4); *resin*: bomb rack fairing (2), 1,000 lb bomb (2) and 500 lb bomb (2); *white metal*: front rocket stub rail (6), rear rocket stub rail (6), rocket projectile pair (6), 60 lb RP warhead (12), RP practice head (12), bomb sway brace (4), 1,000 lb bomb tail cone (2), 1,000 lb bomb tail tube (2), 1,000 lb suspension lug (2), 500 lb bomb tail cone (2) and 500 lb bomb tail tube (2).

This is quite a comprehensive

set of ordnance to hang under any aircraft. The approach of the set has meant that the manufacturer has produced the GP (General Purpose) type 1,000 lb and 500 lb bomb, however, hopefully we may see a few MC and HE versions before too long.

I have a bit of an interest in ordnance and munitions and it is a subject which cannot be easily covered, so I will make just a few observations. Let us start with the bombs; I have already said these represent GP examples. With the 500 lb GP there were no dual lugs (E112), these were on the 500 lb MC. The style of support for the tail tube on the 500 lb GP does not reflect the shape of a No.2 Mk.1 or the later No.26 Mk.I or II, as it should have a curved leading edge, not slanted as depicted in the kit parts (E111), the tail is also retained with four prominent spring clips which are on the outside of the tail body and are not present on the kit parts. The 500 lb GP has a nose fuse pocket, but the arming vane is not present and as the tail arming vane is only two bladed this must be a No.26 Mk.I tail unit. Most of these comments apply to the 1,000 GP, but this does have a far more squat tail

unit with even more pronounced curvature to the tail supports. The bottom of the tail has four holes around its circumference, into which the armourer can reach to finger tighten the tail retainer wing nuts. These holes are shown as slight indentations in the kit parts (M36), but are far too small and are not deep enough.

The rockets are nice, but the mounting saddles are not even attempted, instead simple strops are depicted which do not reflect the real thing very well at all. This is a shame as they would have been quite easy to achieve in etched brass, although a little complex to bend into shape! The 60 lb heads look a little too elongated and thing, looking more like 120 lb examples. The use of the double tier rack does mean that this type of RP is of limited use on World War 2 types, however, the two tier was used on the Vampire Mk.5 (as Mk.8 installation), as well as the Hornet.

Having had a good old go at the products I will now have a go at the painting instructions! It is true to say that the 500 and 1,000 lb GP was painted dark green, AM green No.6 (BS224) to be precise, however, the markings are not as simple as a single red nose band. A GP bomb would have a 1:8th inch red band one inch from the nose and a one inch light green band eight inches from the nose. This green band will be marked with the abbreviated term for the filler and can consist of such things as Lyddite, CE, Amatol, Amatex, Baratol, Minol etc. The list is seemingly endless and between the red and green band, in black or white, will be the maker, fill date and lot number details all neatly stencilled on (oh, for some decals!). The RP are another matter, as they are also dark green overall, the same method of marking the war-

head is used as on the bombs, but a practice head is surely not grey? The standard colour for a drill head would be black, later practice bombs became white (and later still light blue). The heads in this set could therefore be black with 'DRILL' stencilled in white lettering six inches behind the extreme of the nose.

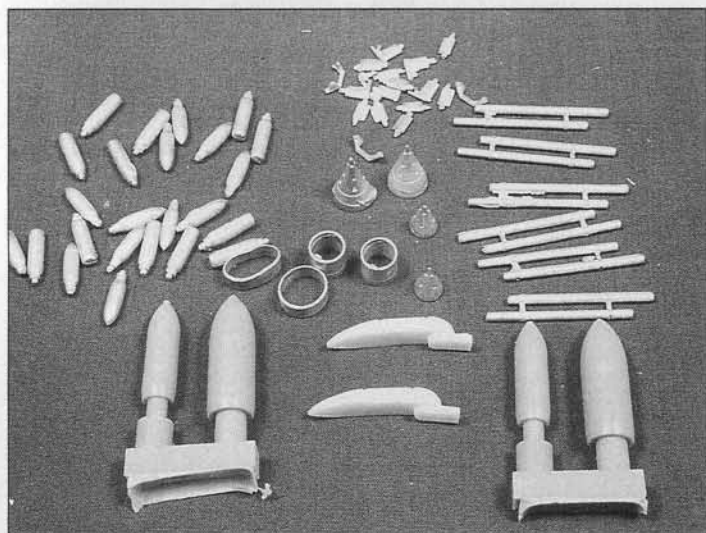
I know that PP Aerokits will be unimpressed by my rantings but they are there more to show that as a topic, general sets of bombs and rockets are simply not possible. I have seen and handled lots of 1940s and 1950s vintage bombs and rockets so I know a little about their complex nature and subtle differences. If you do not check up on the references you could find yourself hanging the wrong style of ordnance off your model.

I am very pleased to see such sets arriving on the modelling scene as for far too long a bomb on a model has been a simple ballistic shape with a tail and a rocket, a tube with a warhead. This approach seems to have been with modelling for decades and it is nice to see a manufacturer such as PP Aerokits at least attempting to put things right. I am sure that these sets will satisfy most modellers requirements and could be made into really detailed and accurate little items with only a small amount of additional work.

My thanks to PP for the supply of this review sample and I only hope there will be more to follow. Do not be put off by what I have said, these are well made and well worth purchasing.

The set costs just £4.95 plus 30p post and packing and is available from the manufacturer at PP Models, Studio 2, Bath Buildings, Montpelier, Bristol BS6 5PT.

Richard A. Franks



The white metal and resin parts of PP Aerokits' 1:48th scale bomb set.

LOZENGE PATTERN DECALS FROM PEGASUS

The use of pre-printed fabric by the German Air Force during World War 1 is quite well known. The idea of camouflage entered the minds of planners very early on in the conflict and had its basis within the field applied versions used by the Jastas in 1915. There are different types of what is called 'Lozenge' fabric and the application of such complex patterns has always been a headache for modellers, especially in 1:72nd scale.

It is therefore with relief that I see Chris Gannon has released these five colour lozenge decal sheets under his Pegasus label. Each sheet has taken many months to develop and the use of Computer Aided Design (CAD) has allowed them to create the pattern to a claimed accuracy of five decimal places! The shapes, patterns and colours for both the upper and lower sets are based on the 'new' fabric created by Silberstief in Germany in the early 1990s. This fabric was almost identical to that produced in World War 1 and it was based on many preserved examples of the fabric found on aircraft within the ex-Eastern Bloc nations.

The first two sets are the upper: blue/grey and lower: pink/violet sheets each coming complete with the correct colour rib tape. Each sheet contains four strips of lozenge pattern, 185 by 19 mm along with 12 185 mm long strips of rib tape. The instruction sheet (A4) contains a narrative on the

development of lozenge fabric as well as information on how Pegasus developed their own decals. This only covers two-thirds of one side of the sheet, the remainder of it plus the back is full of detailed instructions on how to use the decals as well as illustrating the ways in which it was applied.

Overall these sheets are very good. Within my job I am lucky to be able to see examples of genuine lozenge fabric as well as amounts of the new ones produced in Germany. I have held the decals up to the corresponding new fabric and considering such factors as lighting, etc., the match on the upper fabric is very good indeed. However, the lower fabric is too intense on the light blues. An overall wash of a dark varnish may correct this, but overall I still think the sheets are very good indeed. As a point of interest and a factor raised by a fabric and finishing technician, the use of coloured rib tapes was not the only method used. It was quite common for simple strips of lozenge fabric to be used instead, especially with field repairs, etc. So if you feel like a complete change, cut up some strips and add them as tapes instead.

The release of these sheets will hopefully be followed very soon by 1:48th scale examples and they are certainly the best lozenge fabric decals produced so far. I hope that Pegasus may consider the production of four colour lozenge fabric, although no modern production of this has taken place so it could prove far more difficult to achieve. The use of the five colour lozenge is not universal, so check your references before applying it, as

Part of Pegasus' new lozenge pattern decal sheet

your chosen topic may not be in five colour lozenge fabric!

Each sheet reviewed costs £4.99 and they can be purchased direct from Pegasus, Lancaster House, PO Box 50, Whitstable, Kent CT5 2UX.

As a final incentive, if you mention this review and magazine when you order, you will get each sheet *post free*.

Highly recommended.

Richard A. Franks

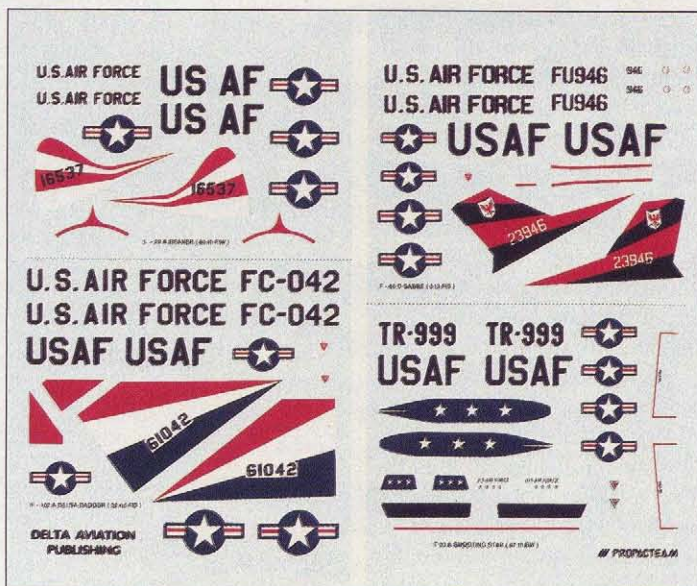
DELTA DECALS

It is always good to see the appearance of a new producer of aircraft decals, particularly if interesting and good quality products which are also value for money are the result. Delta Decals, a new company based in Sheffield, has certainly started in the right direction with its initial release which features several colourful aircraft as flown by elements of the USAF in Europe.

This first release is to 1:72nd scale, and it is the first of a

planned range in this scale. However, the company also intends to begin releasing 1:48th scale decals later this year as well. The general aim is to include approximately four different subjects in each release, with all four subjects linked by a common theme. The themes themselves are planned to be wide-ranging, but many will be of unusual subject matter, and there is little intention to create lots of sheets featuring already overdone subjects such as F-16s.

To return to Delta's first release, 72-001, this sheet comprises markings for an F-86D Sabre, and F-102A Delta dagger, a T-33A and an L-20A Beaver. The colourful markings for these four subjects are in fact printed in the Czech Republic on behalf of Delta by the Czech company Propagteam. As with other sheets produced by Propagteam the printing quality is of a good standard, although other products that I have seen have been



a little on the thin side and have benefited from being applied to a light coloured background. Delta state that these decals react very well to the SuperScale application system. Three of the aircraft covered are in silver finish, while the fourth (the Delta Dagger) is in overall light grey. A page of instructions giving

decal placement is included by Delta, featuring a side view and a plan view for each of the four subjects, together with colour notes and where necessary the relevant Federal Standard paint numbers. Recommended references for each subject are also given, that for three of the aircraft featured being Squadron/Signal's very

colourful *USAF Europe Vol.2*, while the Delta Dagger is covered in the same publisher's *F-102 in Europe* publication.

Overall this is a very worthwhile and thorough release, and Delta state that the retail price in the UK is £3.00 for this first set. Further releases are certainly to be looked forward too. Most good model shops

should eventually be able to supply this decals, but in case of difficulty Delta can be contacted at 38 Hawksley Avenue, Hillsborough, Sheffield S6 2BE, adding 50p for post and packing.

My thanks to Delta Aviation Publishing for the review samples.

Malcolm V. Lowe



Recent 1:72nd AeroMaster Decals (from left): 72-028, 72-035 and 72-073C.

MORE COLOUR FROM AEROMASTER

It seems only a short while ago that I reviewed the recent releases from AeroMaster; hang on a minute, it was only recently! It never ceases to amaze me the sheer number of sheets this company can produce, without any reduction in their quality.

The most recent selection I received, direct from the manufacturer, all came with full colour instructions. I have five 1:72nd and seven 1:48th scale sheets. Instead of going into a long and laborious listing of what is on each sheet, I will take a general look at them and allow the instructions, included as illustrations (hopefully!), to further indicate what is on each.

We will start with the 1:72nd scale sheets. The first, number 72-028, will be very welcome to English modellers, as it is the long awaited 'Battle of Britain Spitfires' sheet. There are no fewer than eight options on this

sheet and include P/O J.E. Johnson's aircraft. All the Spitfires are Mk.IIs and they are from the following squadrons: No.616 at Kirton-in-Lindsey, No.602 at Tangmere, No.610 at Biggin Hill, No.609 at Middle Wallop, No.152 at Warmwell, No.65 at Turnhouse and No.603 (location unidentified) as well as one from No.421 Flight, RAF Hawkinge.

Next comes a sheet which is also available in 1:48th scale. This sheet, number 72-035, is entitled 'Zemke's Wolfpack' and deals with the Republic P-47 Thunderbolt. There are four options on the sheet, two 'Razorbacks' and two 'Bubble-tops'. Two of the options are for Captain M. Gladych's aircraft (42-75140 HV:M 'Pengie II' and 44-21227 HV:M 'Pengie V'), while the others are Colonel Zemke's P-47D-20-RE 42-75864 UN:Z 'Mon Tovarishch 2' and Lieutenant Keeler's P-47M-1-RE 44-21132 'Mr K'.

Moving away from Allied types now, but still within the Second World War era; the next

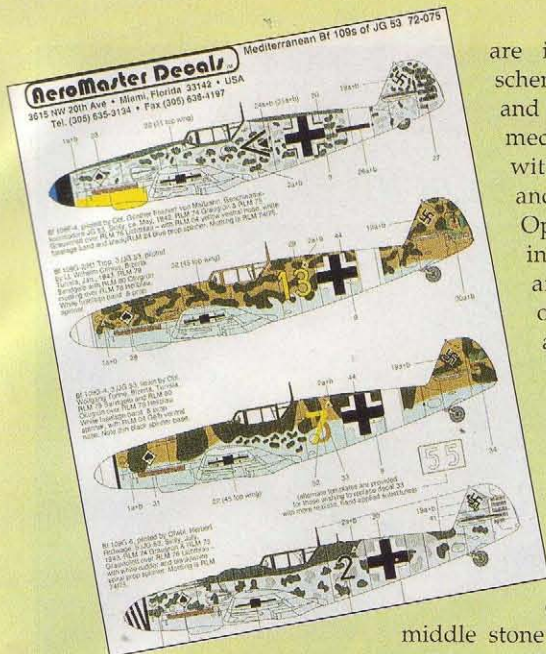
sheet, number 72-073, is entitled 'Desert War Bf 109s of JG 27'. This sheet has five options on it and these consist of two F-4, an F-2 and two E-7s, all of which are in tropical (Trop) configuration. The F-4s are in standard desert scheme of RLM 78 and RLM 79, whilst the F-2 also has a yellow (RLM 04) nose and rudder. One of the E-7s is in RLM 74/75 and 76 with a yellow nose and rudder and a mottle of RLM 74 over the fuselage. The other is RLM 78 underneath with a strange variation of RLM 79 on top. This sheet also contains two complete sets of Bf 109 stencils.

Staying with Luftwaffe subject matter, sheet number 72-074 is entitled 'Mediterranean Bf 109s of JG 27'. Once again this is a mixed sheet of Bf 109s and there are five options on it. These consist of a G-4/Trop in RLM 78/79, an E-4 in RLM 74/75/76 with a yellow (RLM 04) nose and white rudder, a G-6/Trop in RLM 74/75/76 with a white rudder and fin top, a G-6/R6 also in RLM 74/75/76

with a white rudder plus a white spinner with black spiral and a G-2/Trop in RLM 74/75/76 with a red (RLM 23) rudder. Once again this sheet also has full stencils for two aircraft included.

Still with the Messerschmitt Bf 109 in the Mediterranean; the next sheet, number 72-075, is entitled 'Mediterranean Bf 109s of JG 53'. This sheet has five options on it and they consist of an F-4 in RLM 74/75/76 with a yellow lower engine cowl and a black and blue spinner, a G-2/R1 in RLM 78/79/80 with a white spinner and fuselage band, a G-4 in a similar scheme to the previously mentioned aircraft, a G-6 in RLM 74/75/76 with a white rudder and an F-4 also in RLM 74/75/76 but with a white spinner, yellow lower engine cowl and a white fuselage band.

Now let's move on to the 1:48th scale sheets. First of all is another selection for the Spitfire Mk.V. The sheet is numbered 48-122 and is entitled 'Spitfire



are in an A pattern scheme of dark green and ocean grey over medium sea grey with a sky spinner and fuselage band. Option four is also in the same pattern and colours as option one, two and three, but it has a black spinner and four inch ID yellow strips on the leading edge of each wing. The final option, number five, is in dark earth and middle stone over azure blue and has a red spinner.

Yes, I'm still with the Spitfire. The next sheet, number 48-124 is entitled 'Spitfires Down Under' and it is probably my favourite of this bunch. The subject matter is of course the Spitfire, but this time in Australian service. The sheet contains four options and these are Mk.Vc BS219/ZP:X of No.457 Squadron, Camden NSW 1943; Mk.Vc A58-236/QY:G of No.452 Squadron, Darwin 1943; Mk.VII A58-517/UP:F of B Flight, No.79 Squadron, Morotai, New Guinea, 1945 and Mk.VII A58-614/ZP:Q of No.457 Squadron, Morotai in 1945. The first two options are in dark earth and foliage green over azure blue, option one has a sky blue spinner and fuselage band, whilst option two has a black spinner and white inboard leading edges of the wing. Option three is in dark green and mixed green over medium sea grey. The leading edge of each wing and the entire tail unit is white, whilst the spinner is bright green. The fourth and final option is dark green and ocean grey over medium sea grey with those white wing leading edges and a red spinner. This fourth option also has a sharkmouth.

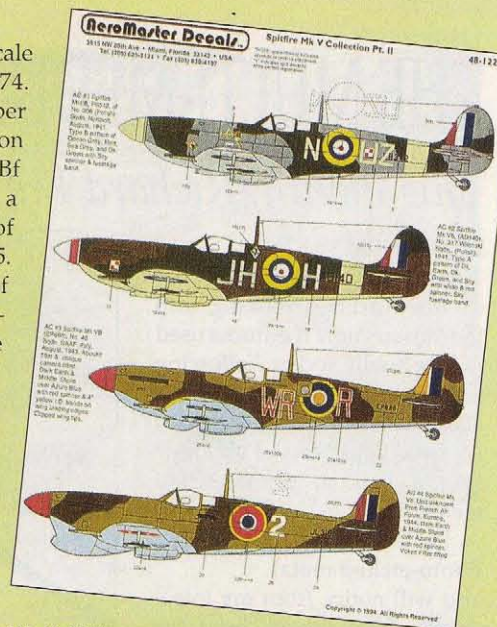
The next three sheets are simply examples previously listed in 1:72nd scale, now transferred to the larger scale. Sheet number 48-127 is 'Desert War Bf 109s of JG 27' and this is a scaled-up version of sheet number 72-073, whilst sheet number 48-128 is 'Mediterranean Bf 109s of JG 27'

and this is a larger scale version of 72-074. Finally, sheet number 48-129 is for a selection of 'Mediterranean Bf 109s of JG 27': this is a scaled-up version of sheet number 72-075. The content of each of these sheets is identical to the 1:72nd scale examples reviewed earlier.

The final sheet, number 48-138, is of an aircraft type very dear to me. It is entitled 'Early Butcher Birds Part I' and it of course deals with the Focke Wulf FW 190 in its earlier derivatives. No fewer than six options are given on the sheet, all of which are either A-3 or A-4 versions. The options are an A-3 W/Nr 20202 of Stab/JG 26, Coquelles, France, 1942; an A-3 of Staff/JG 26 also at Coquelles in 1942; and A-4, W/Nr 1167, of III/JG 2 at Poix, France in 1942; and A-3 of JG 77 at Dombacher, Norway in 1942; an A-4 of 1/JG 51 operated in Russia in 1942 and an A-4/U8, Wr 2403 of 10/JG 26 at St Omer-Wizernes, France in 1942. All bar the fifth option are in RLM 74/75/76 with either yellow or red cowls and/or yellow or white rudders. The fifth option is in RLM 71/76 with yellow lower wing tips and fuselage band.

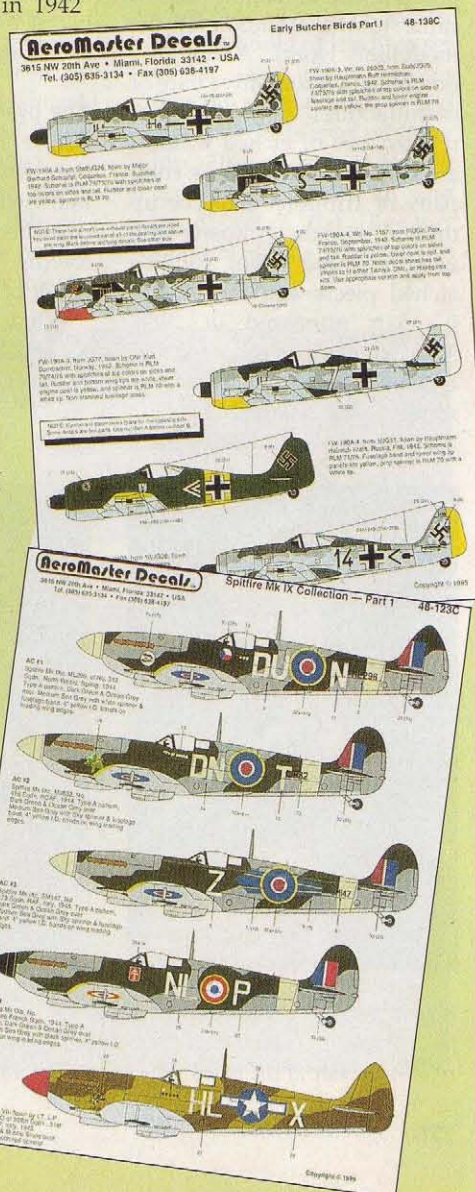
Overall, these are yet more excellent sheets from AeroMaster. I must say that every time I have review samples arrive, I look through them and decide which kits I need to make the options I like. Suffice to say that I like a lot of them, but thankfully do not have the time or money to make them! My thanks, as always, to Gaston Bernal, Jr of AeroMaster for the supply of these samples.

All AeroMaster decals can be



obtained from Hannants or Mary-L Models. The sheets listed above are available at £5.50 each from Hannants, Trafalgar House, 29-31 Trafalgar Street, Lowestoft, Suffolk NR32 2AT or £4.99 each via Mary-L Models, 100 Home Orchard, Cotswold Mews, Yate, Bristol BS17 5XG.

Richard A. Franks



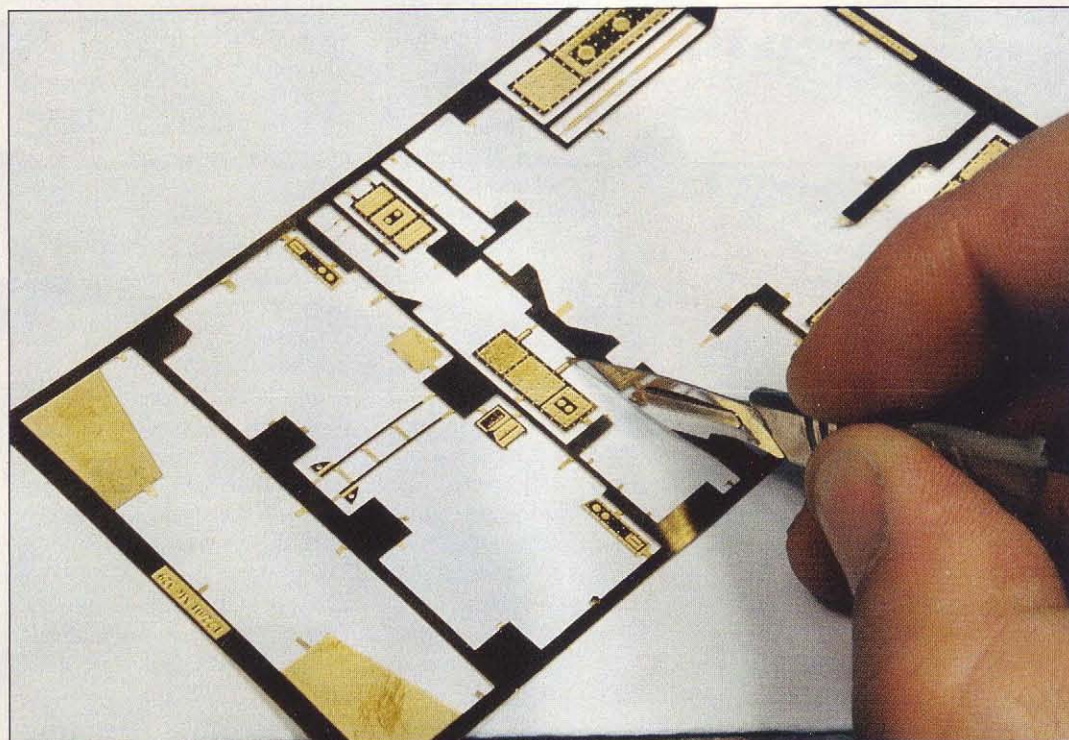
This month, Richard Franks invites us to take a look at his etchings

Introduction

This is the second of my series of three articles looking into the various new mediums used in our hobby today. Following on from my previous article about resin (see *Scale Aviation Modeller* Vol.1 No.4), I will now take a look at photo-etched metal.

Photo-etched metal

You will notice from my introduction that I have used the term 'etched metal' in preference to the more usual 'etched brass'. This is simply because although brass seems to be the preferred medium nowadays, there are manufacturers who use such metals as stainless steel, but more on that later. The process of photo-etching originated in the production of printed circuit boards. It was not long, however, before the possible use of such a process came to the attention of the modelling world. Although I do not have a definitive date or manufacturer for the first retail use of etched metal, I am sure that the Japanese company of Trimaster must be up there. This is the company who used stainless steel for its etched pieces and the first of its kits appeared in 1988. Many companies followed suit and in England the Airwaves range was started by ED Models in Solihull. Today there



are many companies producing such detail etched parts, a list of these will appear at the end of this article.

The process

Before I start, I should point out that I have no practical knowledge of the production of etched brass and all the following information is the result of research.

What is photo-etching? Essentially photo-etching is a chemical-milling process. As the name suggests it is a photographic process, the design is

photographically imprinted on light-sensitized metal, which is then developed. The developed image protects the metal underneath, while the etching chemicals eat away any unprotected metal. The process can be further refined to produce un-etched, half-etched and full-etched, which are basically the depths at which the chemicals eat into the brass.

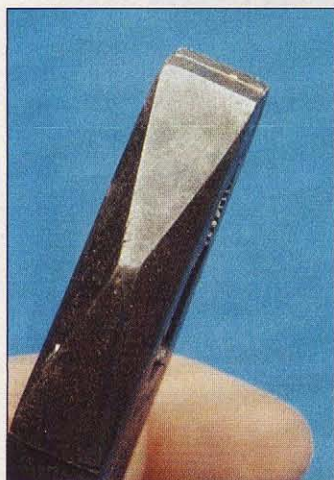
The first stage in the process is to produce a set of working drawings, which are reduced to produce a positive image for etching. This artwork is produced at larger scales than the final product, some manufacturers use a factor of eight, while others use a factor of five. The artwork is drawn and is coloured to produce the different levels of etching. All of the black areas will be unaffected by the etching process (un-etched), all the red areas will be reduced to half thickness (half-etch) and any white areas are completely removed (full-etch). Once completed the drawings are reduced by the scale factor (1:8th or 1:5th) and from this a high-contrast 'litho' image is created. This image is positive in preference to a negative one, so that what was originally drawn will remain

Removing etched metal from the fret – place the fret on a piece of paper or a tile and cut with a new blade in your scalpel.

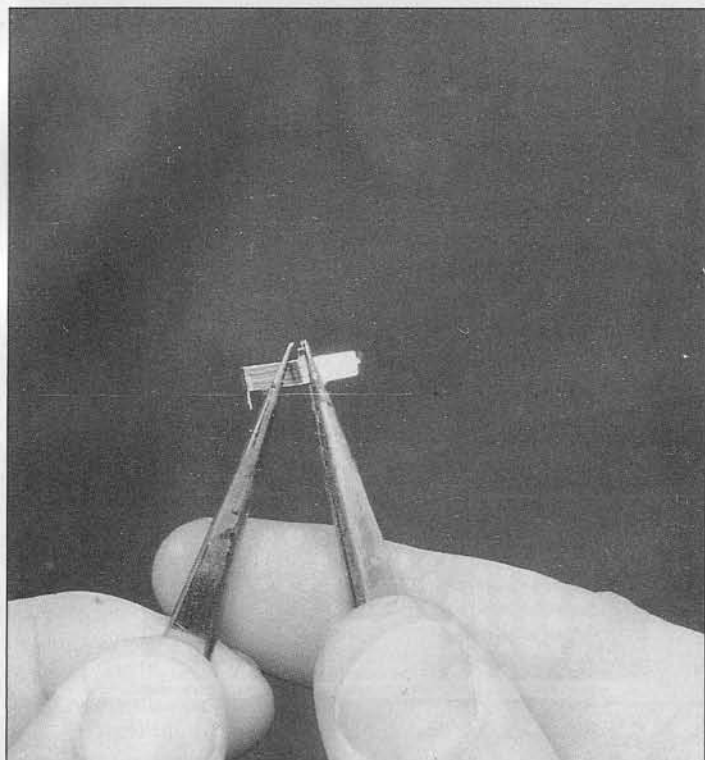
the same, only smaller.

Once the litho positive image is created, the brass needs to be made light-sensitive. Brass sheets of 5, 10 or 15 thou can be used, it is truly a case of the manufacturer's preference, or consideration with regard to the need for flexibility in the finished pieces. The brass is given two heavy coats of a chemical called 'photo-resist', either via a dip or by spray. As this chemical is light-sensitive it has to be applied under subdued light (but not total darkness, thankfully!). The brass is then stored in a light-tight container whilst it dries.

The sensitized brass and the image are now exposed to a strong ultra-violet light source. The exposure time depends on the instructions given with the photo-resist chemical, but can vary between two and five minutes. The image and brass are then removed from the UV light and separated. The brass is then placed in a tray filled with standard photographic developing fluid. Developing time will vary depending on



Removing ragged edges from etched pieces. Left: Hold the part with edge flush to the tips of flat nosed pliers – the ragged edge is just visible on the right hand side of the pliers' edge. Right: Clean the edge with a flat file.



How to bend etched metal – always try to use tweezers as your fingers will never cope!

the developer you use, but can be between two and five minutes. To stop the development the brass is removed from the fluid and rinsed under a running tap. The developer may turn the image green or blue and the rest of the etching process can now be achieved under normal lighting.

The brass will now be etched in warm (100 to 125 degrees F) ferric chloride. This is a highly corrosive compound and protective clothing is a must during these stages, especially gloves unless you want to dissolve your hands! The fluid is contained within a metal or glass container and the brass is removed and thoroughly rinsed to stop the etching process. The remaining photo-resist is removed by rubbing the brass with lacquer thinner and scrubbing with wire wool.

And there you have it; a fret of etched brass components!

Working with etched brass

You will notice that I have reverted to the term 'etched brass', this is because brass

Trimaster of Japan can quite possibly lay claim to being the first retailer to use etched metal parts in its kits. This is the Fw 190A-8 set in stainless steel – the range is now marketed by Dragon.

seems far more popular than any other metal. The following preparations etc, can, however, be applied to most other forms of etched metal.

1. Preparation

All etched components will come on a sheet, this is referred to as a Fret. The fret is similar to a sprue on an injection moulded plastic kit and it simply holds all the pieces in place to ease retailing the product. You may



Condor's 1:72nd scale German missile set No.2 – the Fritz X's tail is entirely constructed from etched brass.

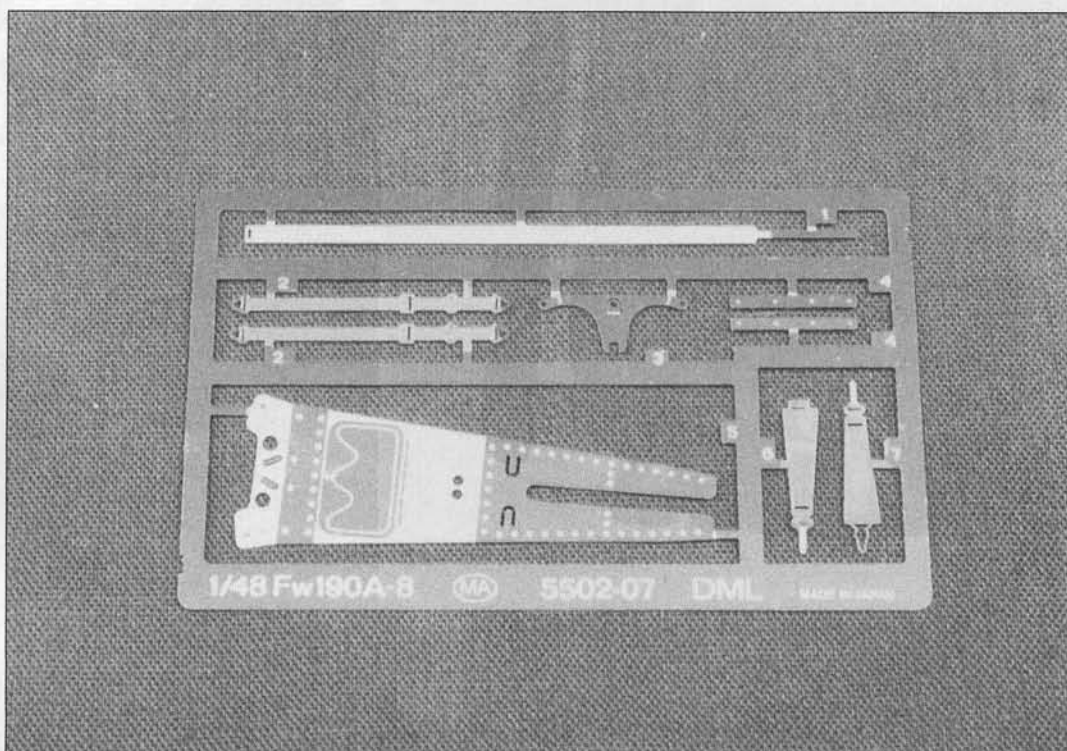
wish to get the pieces off the fret and just use them, this however is not the best way to do it.

Each etched piece you require should be prepared in the following manner:

- (a) Before you prime etched components it may be necessary to anneal them. This means that you should heat the etched brass until red hot and then leave it to cool. It will make the brass bend and conform to complex compound curves far easier. *Note: Always wear asbestos gloves and use suitable tongs when attempting to anneal brass, never leave the piece unattended during cooling.*
- (b) Prime the pieces first. Grey acrylic spray available in cans from Halfords is an excellent medium for this as

it is very fine and dries quickly.

- (c) Place a sheet of clean paper over a hard surface such as a sheet of glass or a ceramic tile. Put the fret on this surface and with a new blade in your scalpel, cut the piece from the fret. The paper will absorb the cut without allowing the brass to bend and it will also stop your scalpel slipping about.
- (d) Remove the separated piece from the fret with tweezers. Now get hold of it with a set of flat nosed pliers. Ensure that the ragged edge of the etched piece is level with the top of the pliers nose. Whilst holding the pliers in one hand, get a flat file and smooth off the edge of the etched piece.



(e) Your etched piece should now be ready for installation. Many etched pieces need to be bent into shape, normally involving putting 90 degree bends in, etc. To do this it is best to use a combination of tweezers and pliers or, alternatively use Airwaves special etched brass bending tool.

(f) Use a set of locking tweezers and either another set of normal ones or pliers for any manipulation of etched components, your fingers will never cope!

(g) It is only possible to secure etched metal to plastic or resin with the use of cyanoacrylate or epoxy cement.

(h) Once again use tweezers to position etched pieces during glueing, as its embarrassing trying to get your fingers off of the model once they are glued in position!

of this depth. Etched parts cannot produce tubular structures.

When you cement any etched piece in place it is best to use tweezers to hold the part, as it may be very small. Position the part and then apply the cement using an old scalpel as an applicator. This method of applying cement should reduce the amount of cement you use as well as reducing the risk of spoiling the component's appearance with visible dabs of cement. You may wish to utilise some accelerator with your superglue, as this will really speed things along and stops you having to hold the part in place until the glue cures.

Many etched components have to be bent or curved, this may even involve creating complete tubes with them. Always ensure you have lots of pieces of metal and plastic rod around – they are very useful to curve etched brass around.

2. Assembly

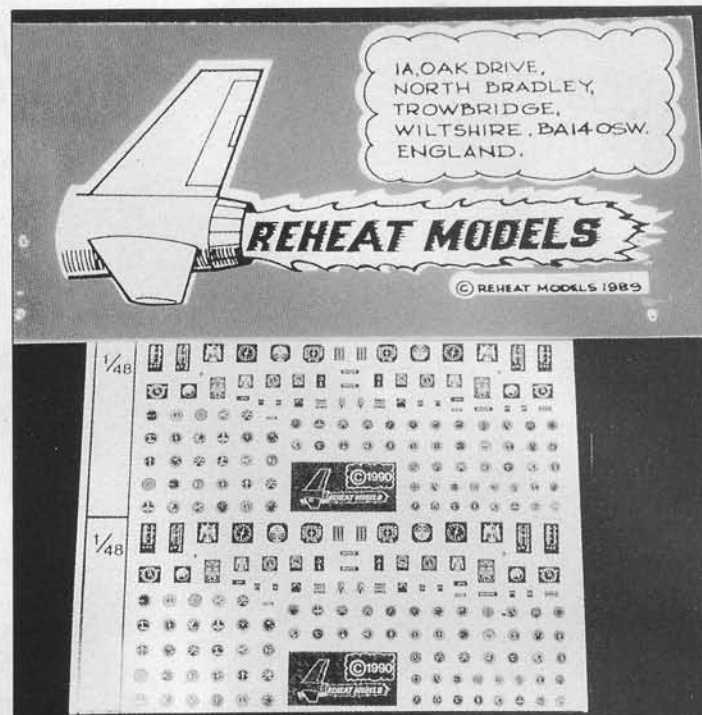
I have already touched on a bit of this section in the above listing (points f, g and h), however, a little further illustration is called for.

Etched components may, by their very nature, be very small. They are also only two-dimensional, meaning they only have length and breadth without any real depth. Etching however, will only give you a full or half rendition

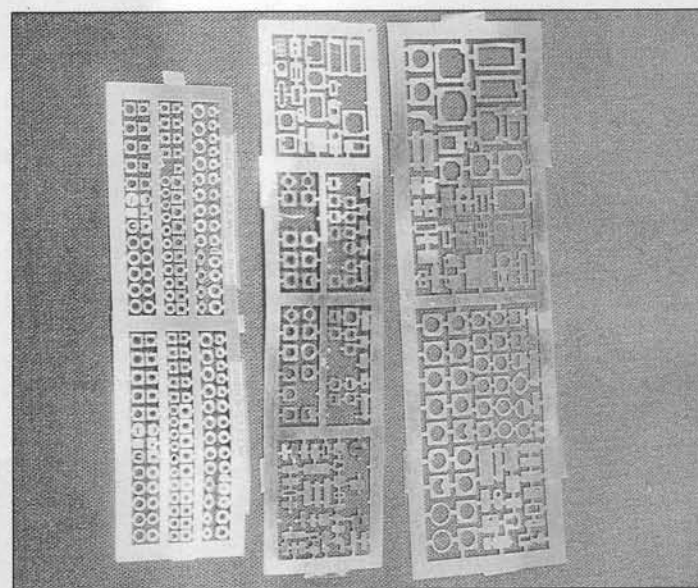
3. Final painting

Resin can be painted with enamels, acrylic or cellulose paints. Using a suitable primer barrier, eg Halfords acrylic spray, it should be possible to use most forms of paint with little or no detrimental effect on the etching. The surface detail will be shallow, so do not over apply the primer, a very light coating will suffice.

Once primed and fitted etched pieces can be painted



The 'Reheat system'. Above are the 1:48th scale instrument faces, while below we show the etched instrument bezels – the first two sheets are in 1:48th scale, the bottom in 1:72nd scale. The sets contain parts for up to 170 instruments!



and treated as any other component in your model, just be aware that they are fragile and will crush.

as little as £1.50 for the Eduard basic sets, whilst the amazing Flightpath 1:32nd scale frets cost well over £15.00.

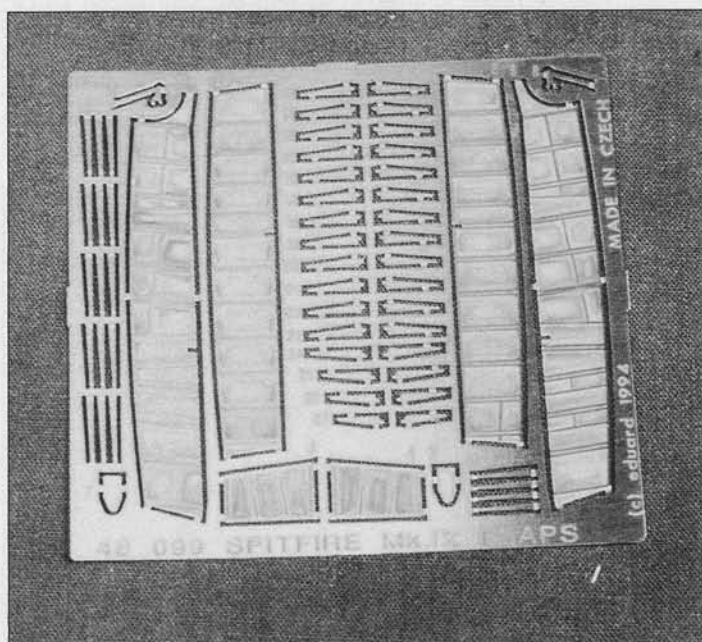
HAZARDS: Brass in itself is not a hazard. However, the small size of the resulting component may well be. Here are a few ground rules in regard to the handling and use of etched components:

- 1 Always wear safety goggles whilst cutting etched brass.
- 2 Cyanoacrylate and epoxy cements are the only types you can use on etched. These are toxic, so wear a good fume mask whilst working with them.

4. Notes and comments

CHOICE: etched brass is a relatively easy medium to work with. It will allow you to add greater detail to your latest project and for many components it cannot be surpassed as a reproductive medium.

PRICE: The price of etched brass detail sets varies, depending on what you get for your money and how complex the production of the fret was. You will start paying prices of



Etched brass can be used to produce a multitude of items: this Eduard set in 1:48th scale provides a set of flaps for the Spitfire Mk.IX. It's the only way to model flaps!

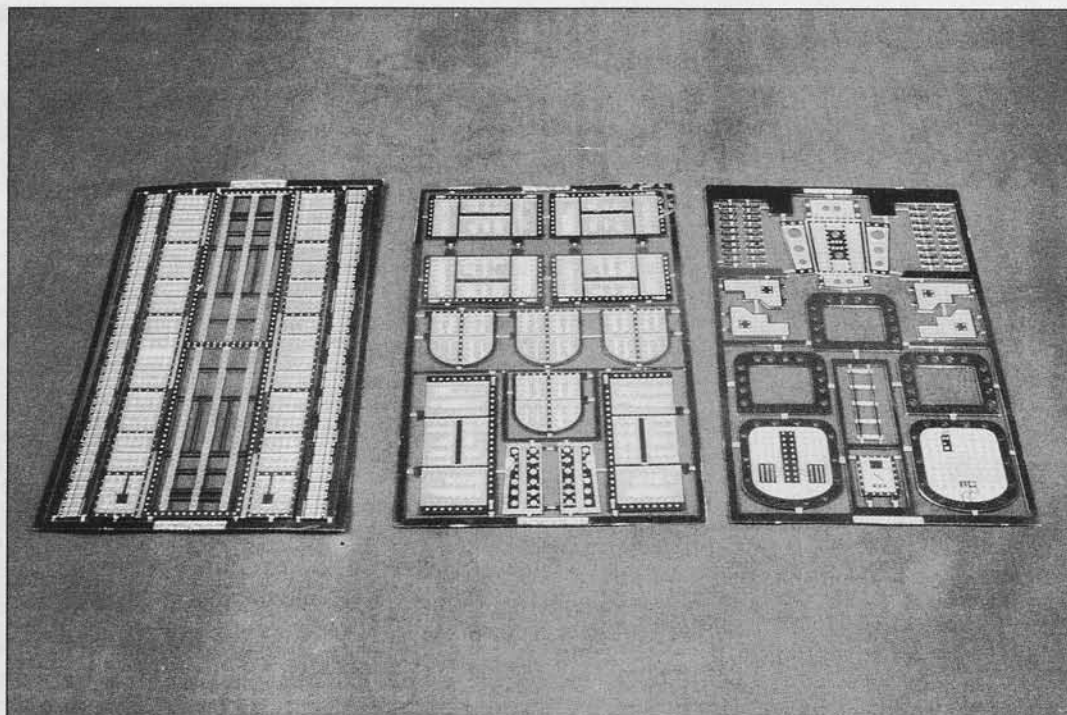
Toad Resin's range includes etched brass detail sets as well as resin kits: these frets are for the Heinkel He 177.

3 Finally as most of the etched pieces will be small do not leave them about, especially if you have young children or pets in your household. Be sensible where you work with etched brass – think of the safety of others.

4 Considering the above hazard, do not have food or drink near or in your work environment whilst you are using etched parts.

5. Conclusion

Etching as a medium has added another dimension to our hobby. The finesse and delicacy of components we can achieve in our modelling thanks to the etched brass really has taken the hobby into an art form. It's a complex medium, mainly due to the small



size of the components, their fragile nature, their amazing ability to spring out of your tweezers into the carpet, never to be seen again! and the way

installing them makes you go quietly insane!

I have said it before, but never be put off by the fact that a model contains etched com-

ponents, as they are easy to work with (I promise you!).

Next month Richard looks at white metal components.

LIST OF MANUFACTURERS

This list is not exhaustive and we welcome any additions and corrections. We have where possible given the addresses of UK importers or distributors for foreign companies.

AIRWAVES, c/o ED Models, 64 Stratford Road, Shirley, Solihull, West Midlands B90 3LP.

AEROMASTER, 3615 NW 20th Avenue, Miami, FL 33142 USA[#]
Available in UK from Mary-L Models, 100 Home Orchards, Cotswold Mew, Yate, Bristol B17 5XG.

EDUARD, Czech Republic
Available in UK from Four Plus UK, 29 Westwood Garden, Hadleigh, Benfleet, Essex SS7 2SH.

ESOTERIC MODELS, Hangar, 3a Main Road, East Hagbourne, Didcot, Oxon OX11 9JL[#]

HI-TECH, 18 Rue Fernand Collot, Nanteuil Le Meaux 77100 Meaux, France[#]
Available in UK from Hannants, 29-31 Trafalgar Street, Lowestoft, Suffolk NR32 3AT.

HIGHLIGHT REPLICAS. Address not known.
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JMGT, 71 Grande Rue, 95760 Valmondois, France[#]
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KOSTER AERO ENTERPRISES, 25 Glendridge Drive, Bedford, MA 01730 USA
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MAINTRACK MODELS, 79 Queen Road, Hastings, East Sussex TN34 1RL[#]

PP AEROKITS, 9 Bath Buildings, Montpelier, Bristol BS6 5PT[#]

REHEAT, 1A Oak Drive, North Bradley, Trowbridge, Wilts BA14 0SW.

RESITECH, Unit 6, 1B Packington Square, London N1 7UA[#]

TOAD RESIN, 152 Godstone Road, Caterham, Surrey CR3 6UB.

TOM'S MODELWORKS, 1050 Cranberry Drive, Cupertino, CA 95014 USA
Available in UK from Aeroclub, 5 Silverwood Avenue, Ravenshead, Nottingham NG15 9BU.

TRUE DETAILS, c/o Squadron Products, 1115 Crowley Drive, Carrollton TX 75011-5010 USA
Available in UK from Pocketbond Ltd, PO Box 80, Welwyn, Herts AL6 0ND.

VERLINDEN, Ondernemerter 4, B-2500 Lier, Belgium[#]
Available in UK from Historex Agents, 3 Castle Street, Dover, Kent CT16 1QJ.

WALDRON PRODUCTS, USA.
Available in UK from Hannants, 29-31 Trafalgar Street, Lowestoft, Suffolk NR32 3AT.

XTRAPARTS, Hannants, 29-31 Trafalgar Street, Lowestoft, Suffolk NR32 2AT.

Notes:

[#] Companies that do not market individual etched sets, but do include etched pieces in some of their other projects, kits, conversions, accessories, etc.

Koster Aero Enterprises produces individual etched sets as well as including them in other products within the company's range. Pocketbond and Historex are importers only; for retail supply contact specialist model shops, such as Hannants, ED Models, Wonderland Models and Maintrack Models.

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Full list of Eduard, Propagteam, Tally Ho!, Koster Aero Enterprises, Missing link are available free of charge with an order or on receipt of an SAE.

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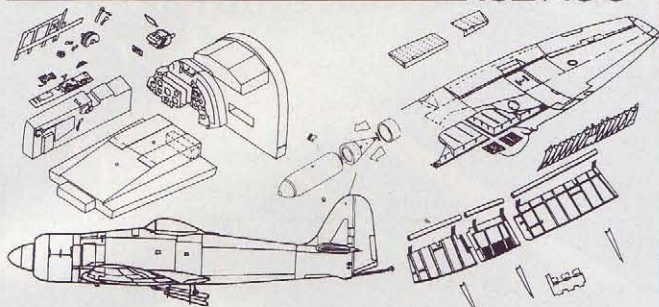
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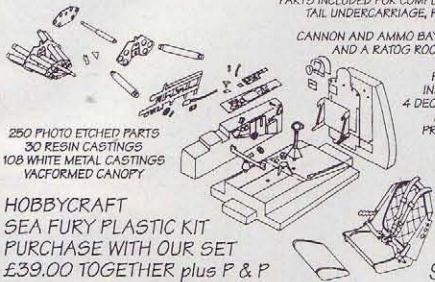
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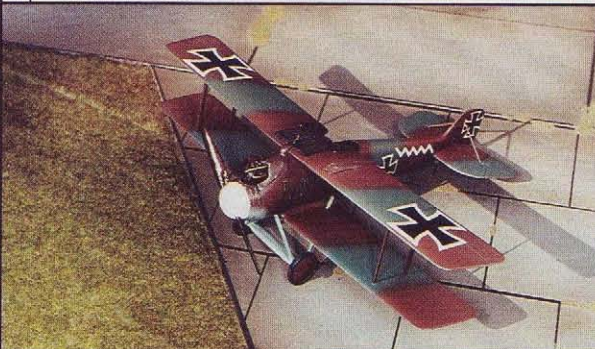
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McDONNELL DOUGLAS T-45A GOSHAWK

Gary Madgwick dusts off Italeri's five-year-old representation of a pre-production aircraft and brings it up to full in-service trim





Before launching in to this project, I needed to research the Goshawk story and acquire reference material (see panel on page The only kit produced so far as the 1:72nd scale Italeri version. This first released about five years ago and is of the pre-production version. To bring the kit up to full in-service modifications I first started my research into the aircraft together with photographs obtained from British Aerospace.

HISTORY

The McDonnell Douglas T-45A Goshawk is the result of the VTXS Programme initiated in 1978 which looked at all the rivals together with the existing fleet of US Navy training aircraft.

The British Aerospace Hawk was judged to be by far the superior aircraft and so was selected in 1981 with funding available from the 1984 defence budget. The contracts were signed in May 1986 with McDonnell Douglas as the prime US contractor. British Aerospace is the principal subcontractor and manufactures the wings, centre and rear fuselage, fin, tailplane, windscreen, canopy and flying controls.

The T-45 is set to replace both the T-2C Buckeye and the TA-4J Skyhawk in US Navy service and has become the principal US Navy training aircraft.

The Goshawk has had major alterations made to its airframe and landing gear to make it compatible with carrier operations. The basic Hawk 60 design has been altered with a



new deeper re-profiled nose to accommodate the twin nose wheel and catapult launch bar and holdback. A six-inch-taller tail fin and four-inch increase to the tailplane.

The most noticeable difference is around the rear fuselage which now has twin side air brakes instead of the under-fuselage one on the Hawk and new 'smurfs' (side mounted unit horizontal root tail fins) which are small curved-shaped items above the airbrakes. A single ventral fin incorporating the arrestor hook has also been added to the rear lower fuselage.

The wings have also been totally redesigned with electrically operated full span leading edge slats and squared off wing tips. Other modifications have included work on the main undercarriage which now features longer oleo legs again to take the stresses of carrier operations.

In the cockpit, new Martin-

Baker Mk.14 NACES ejector seats have been fitted, together with a standard US Navy instrument panel and radios. At present a new glass instrument panel is being tested on a few Goshawks which will be retrofitted to the existing fleet and is being introduced on new aircraft as they come off the production line.

The first YT-45A made its maiden flight in March 1988 and some fairly major problems were encountered which delayed full testing of the aircraft until 1990.

The Naval Air Test Center at Patuxent River in Maryland carried out all the testing of the modifications and the US Navy had completed its evaluation by December 1990, when the aircraft was released to the operational training wings.

INTO SERVICE

USS John F. Kennedy had the honour of being the first carrier to receive the Goshawk when T001 (the first prototype) land-

ed for a four-day sojourn on 16th December 1991. The aircraft made a total of four flights during which it was catapult launched 33 times and 12 touch and goes were made along with four bolters, 26 practice missile approaches.

The first operational training squadron is VT-21, which previously flew TA-4Js. The squadron is part of Training Wing 2 based at Naval Air Station (NAS) Kingsville in Texas. VT-22 and VT23, also

based at Kingsville, will eventually operate the Goshawk, also under the guide of Training 2, carrying tail code 'B'. The other main Goshawk base will be NAS Meridian in Mississippi, where the aircraft will operate in the intermediate and advanced training roles. The squadrons involved will be VT-7 and VT-19, forming part of Training Wing 1 and carrying the tail code 'A'.

NAS Patuxent River and Edwards AFB also have Goshawks for testing. In total 174 T-45As are on order for the US Navy whilst a follow on order to see the aircraft into the 21st century is not out of the question.

The introduction of the T-45A will result in a reduction of 16 per cent in flight hours, 15 per cent in simulator hours, 43 per cent in total training aircraft required and 37 per cent in the number of simulators as well as 16 per cent fewer instructors. The aircraft will ultimately give the Navy better

trained Naval Aviators at a considerable cost saving.

This is a great achievement for an aircraft that is entering the 21st year after its first flight and shows what a good design



the Hawk family of aircraft has become with newer and updated models still on the production line at the moment and will be for some considerable time.

THE BASIC ITALERI KIT

The kit comes in the Series 1 range and costs around £8.25. The box artwork is very striking, showing the pre-production aircraft in the colours depicted on the decal sheet. As with all the kits in this range, painting instructions are on the reverse of the box. Care must be taken here as Italeri has got the red demarcation lines on the wing in the wrong position and their FS code for the US Navy red is also wrong.

The parts come on two sprues and are cleanly moulded in white plastic. There are 49 parts plus three clear parts for the cockpit glazing. The decal sheet is useless for a production version as it carries the wrong size US markings and wrongly coloured NAVY lettering and aircraft code markings.

The Scalecast rear fuselage set consists of new resin halves

including the fin and strake with separate airbrakes.

The wings come in six parts with lowered slats and flaps. (The front slats are not correct for production standard aircraft – something I discovered just as I was completing the model!)

COCKPIT DETAILING AND FUSELAGE SURGERY

The cockpit was painted Xtracolor interior grey with details picked out in black and dark grey. Instrument panels were made from the Airwaves detail set and Modeldecals Hawk instrument panel decals. These were all assembled and fixed into one half of the fuselage.

The fuselage halves were taped together and then razor sawn in half to the position as



shown on the Scalecast instructions to remove the rear kit fuselage.

The kit parts were cleaned up and then glued together and set aside to dry.

PREPARING THE RESIN

While I was waiting for the kit parts to set I cleaned up the resin parts and the wings ready for fixing in position with superglue. (I always put on a dust mask and surgical gloves when using resin.)

After leaving these to dry out overnight the joint lines were filled and then sanded when dry. This was quite a task as the resin to plastic joint was raised on one side and the wings left 1.5mm gaps which had to be filled with plastic strips and then filled.

The sanding took most of the engraved kit detail off so I then removed any other engraving as on the real aircraft there is not much panelling visible. After all the sanding had been carried out the remainder of the kit parts were added and

detailed as required.

The Scalecast dropped flaps and slats were also fitted and the actuators altered to fit. The kit was again cleaned up and washed in warm water with a dash of washing up liquid.

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all available from Hannants.

I masked the open cockpit and sprayed the completed model matt white and when dry I was able to see areas that need further attention. The two areas I was still not happy about were the resin to plastic fuselage joint and the underside of resin

wings to plastic joint. These needed quite a lot of further filling and sanding to get an acceptable result.

UNDERNEATH THE MODEL

After another coat of matt

MODELLING THE McDONNELL DOUGLAS/BAe T-45A GOSHAWK IN 1:72nd SCALE

One of my favourite aircraft flying is the Hawk trainer and over the years I have built quite a few of the RAF and foreign Hawk T.1s together with a recent conversion of the Hawk 100 (which will be reviewed in a forthcoming issue of *Scale Aviation Modeller*).

The Goshawk has been on my 'wants' list for a couple of years and at the IPMS show last year Hannants were selling the Scalecast conversion set and wings.

I had already purchased the Italeri Goshawk and the accessories spurred me on to build the kit. The only other accessories obtained were the Airwaves detail set and the Aeroclub NACES ejector seats, both of which were kindly supplied by ED Models.

Although I did not use it, the PP detail set also contains some of the parts. Also included are the weapons pylons and, again, these can be fitted if required.

I intended to finish the kit on a carrier with the Fujimi. Mule and their carrier personnel with coloured jackets.

The total cost of the kit and the accessories comes to around £16 which does not include the decals, which came from a multiple of sources and were handpainted onto clear film.

This conversion is not for the faint hearted and took me longer to build than my Hasegawa Tornado F.3. I also encountered problems with the Italeri kit, from which some parts were missing and others broken.

Although I wrote on two occasions to RIKO, who are the importers for Italeri kits, I received no response and eventually had to buy another kit to finish it off in time for the publishing deadline.



white I was ready to start the final detailing.

First, the front undercarriage twin wheel catapult launch leg needed refining and some small details were added as per my photographic reference. The main undercarriage wheel bays also needed cleaning up and boxing in. The oleo legs were then fitted. Note that the main doors are closed when the aircraft is parked.

The airbrakes are also fitted at this stage, together with the hydraulic air brake actuating arms made from plastic rod and a metal pin. From the photographic reference I noted that the rear fuselage above the exhaust was different to other Hawks, so again this was built using the photos as reference.

Basically this consists of a thin piece of plastic card 7 mm by 3 mm with two strips of 1 mm square micro strip 3 mm long fixed 1 mm in from either side with a 6 mm long x 1 mm micro rod piece which sticks out 2 mm from the rear fuselage and fixed under the port side tailplane.

Lastly another 1 mm diameter strip of micro rod goes under the flat plate just off centre to the opposite side to the other rod and sticks out about 1.5 mm.

All the aerials and navigation light holes were added at this stage.

FINAL FIDDLING

The two Martin-Baker ejector seats were detailed and added, together with the front HUD and a new central glazed windshield on top of the central

instrument coaming.

The canopy was painted interior grey to match the internal surfaces and was fixed into position. The wheels were also painted and put aside to dry and fixing after the main painting had been finished.

After a final clean up the model was masked ready for painting.

PAINTING

At last, I thought, on to the easy bit. Wrong! I should have

Aviation Modeller, I do not intend to get into the debate on the correct FS colour shade for this colour. (Any help and enlightenment from readers in the USA would be welcome.)

My own preference is to use Xtracolor X14 (BS.537) signal red. This matches very well with my paint swatch that I'd matched against a T-45 I saw on my last visit to the States. I had major problems with the Xtracolor paint on the second coat – when no matter what I

main areas to be painted were the gloss red inside edges of slats, air brakes and flaps. This was quite tricky and with hindsight these should have been painted first and masked.

Another area that needs painting and don't be fooled by the decal sheet is the red warning ring around the engine intakes. I used Xtracolor X103 (FS.11136) insignia red for all these details.

The undercarriage was painted gloss white and highlighted with silver and black and the wheels were then added. The anti-glare panel and the buff-coloured strip around the main canopy were also added at this stage. Other small areas of black and silver were painted as per the reference photos and again the model was set aside to dry.

DECALS

Onto the last leg? Or so I thought. Making this model had become like a race, trying to finish it in time for the editorial deadline. The only usable items on the decal sheet were



known better. I first sprayed the complete model Humbrol gloss white 22 mixed with 30 per cent thinners and this gave a very good finish.

Next, I remasked the new areas and sprayed the red training colour that the US Navy use.

As Malcolm Lowe stated in his article on the US Navy's Torjans in Issue 2 of *Scale*

did it would not dry.

I resorted to cleaning it all off with white spirit and a light sand with 1200 wet and dry. First the white had to be touched up before trying again. This time I used a new tin ordered directly from Hannants which worked nicely.

I left the whole model to dry for 48 hours and then started painting the other details. The

the stars and bars for upper and lower wings, the red 'No Step' warning markings, engine intake triangles and the other small fuselage markings.

Do not use the NAVY title, serial numbers or the US insignia on the fuselage side, as all of these are too big! I first cut up Carpena sheet 72/21 for *USS Forrestal* and Navy titles. From the Superscale sheet came

US insignia: this the covers various star sizes used for the fuselage sides.

The Airfix Hawk decal sheet supplied some of the smaller markings and the Hasegawa F-18 Hornet provided the nose and tail numbers. I chose to model aircraft 163610 coded '200' which was the replacement for 163600, also coded '200'. The serial numbers and Training Wing 2 (TW-2) markings all came from Sable decal sheet 9-72" this is the sheet for Canadian Armed Forces aircraft codes.

Lastly, the 'B' for NAS Kingsville was drawn and hand painted onto clear decal film and then added to the tail fin.

The decals were all sealed using Humbrol Decal Cote 1 and 2 and then given a coat of gloss varnish.

To complete the model the Bluebird MV range of lenses were used for the wing tip navigation lights whilst Premier Plus clear and red tear drop lights were added to the fuselage behind the canopy. (Yes, both clear and red lights

are fitted.) A red navigation light was also fitted to the underside between the engine intakes and lastly the nose wheel light was added.

FINISHED!

Although I am really pleased with the finished kit and it looks very striking it has been a frustrating model to make. This has not been helped by the delay caused by the missing and broken parts or the paint not drying.

As stated earlier it will go on

REFERENCES

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Journal of Military Aviation June 1993.

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World Air Power Journal US Navy and Marine Corps Aircraft.

IPMS Magazine Issue 1/95

British Aerospace Library Pictures

a base board with mule and deck crew in time which will make a nice diorama.

Come on Fujimi or even better Hasegawa what about a

state of the art Goshawk?

My thanks to ED Models for the detail set and ejector seats and British Aerospace for the supply of the superb photos.



TWO-SEAT EUROFIGHTER APPROACHES FIRST FLIGHT

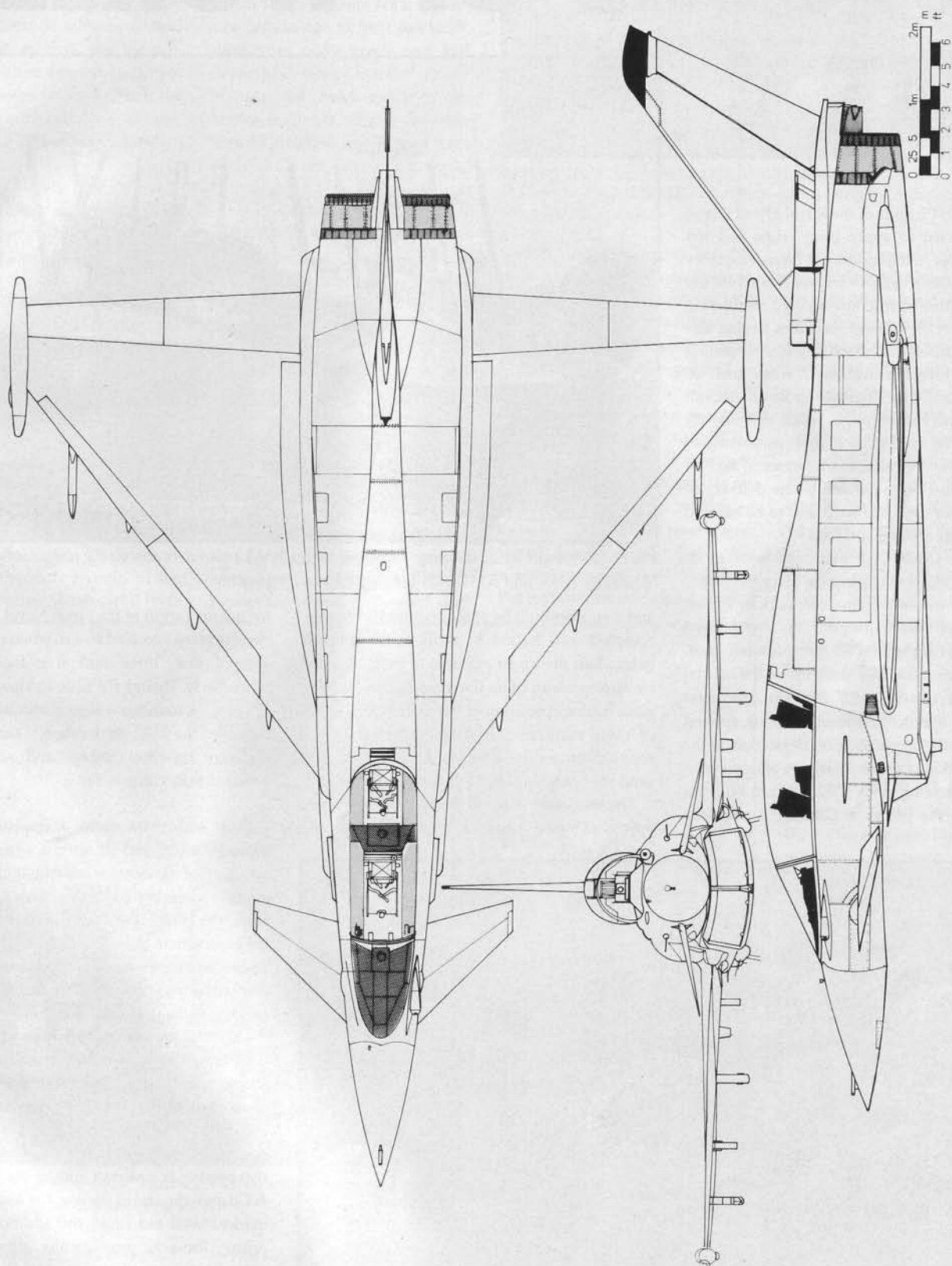
The maiden flight of the first two-seat Eurofighter 2000, aircraft DA4, is expected this autumn. The aircraft, which is being assembled by British Aerospace at Warton, has received the military serial ZH590. Gary Madgwick has

kindly provided us with drawings for the two-seater. He warns, however, that to convert one of the kits of the single-seat version is a mammoth undertaking! Perhaps we'll see one at the Nationals in November...

Our thanks to all at British Aerospace for affording Gary the opportunity to measure the aircraft, and for our picture.



EFA
EUROFIGHTER 2
TWIN STICK



DRAWN BY
GARY MADGWICK

BRITISH AIRCRAFT COLOURS OF WORLD WAR 1

On 16 May 1915, units of the Royal Flying Corps were instructed to apply, blue, white and red vertical stripes to the rudders of their aeroplanes in similar fashion to those on French aircraft. On 23 June a further instruction required roundels to be painted on the sides of machines having fabric covered fuselages, effectively distinguishing them from French machines. A week later, 30 June, the War Office notified the Royal Aircraft Factory, North Farnborough, which was responsible for the acceptance and approval of aeroplanes from private manufacturers, that all machines must be so marked before delivery to units and that roundels were also to be painted above the upper wing surfaces.

Although Union Jack markings were to be replaced by rudder striping on aircraft 'in the field', they and other obsolete markings were retained on many aircraft in the United Kingdom. The position of the roundels (red, white and blue 'circular designs' in the official terms) at first varied with different interpretations of the instructions; roundels were applied variously to the upper wing centre-section, to the fuselage decking or to top surfaces of upper and lower wings of biplanes. BE.2c aircraft built for the RFC by the British & Colonial Aircraft Co



BE.2c 1184, built by Eastbourne Aviation, wears RNAS roundels above the wings, as required in November 1915, and RFC-style Union Jack marking on the rudder.

and a number built by other manufacturers were accepted and issued to units with roundels painted on the upper surfaces of tailplanes and elevators instead of on the mainplanes – a complete misinterpretation of the instruction. A few of these early aircraft retained their tailplane roundels in service with No.7 Squadron, RFC until the beginning of 1917.

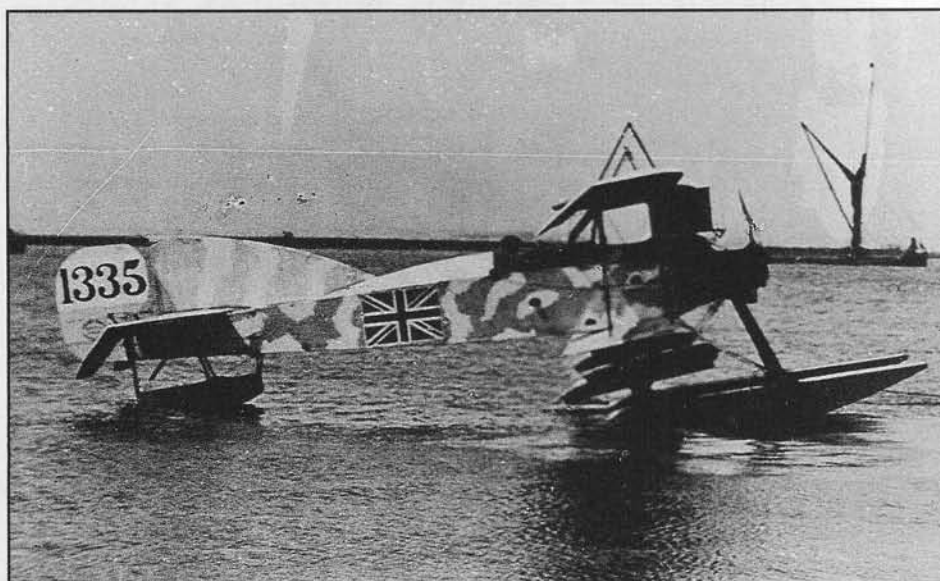
The markings adopted by the RFC were also approved by the Admiralty on 1 November 1915

for use on aircraft of the Royal Naval Air Service, the size being specified as red, white and blue circles of one, three and five foot diameter respectively. Though the sizes and locations of the upper wing roundels was soon regulated for aeroplanes of the RFC; the location, earlier usually mid-way between fuselage and wingtip, was required to be closer to the

outer end of the upper mainplane. Fuselage roundels on BE and RE aircraft were located six inches aft of the elevator bell cranks and, on other aircraft, six inches aft of the lower wing trailing edge. The position of aircraft serial numbers varied from firm to firm. On some aircraft they were painted across the rudder stripes, others were remarked on the tail-fin or on the fuselage sides, just forward of the tailplane.

On naval aeroplanes, variations were accepted with equanimity. Blue, white and red vertical stripes were painted on the rudder surfaces, as on aircraft of the Aviation Militaire, but a few had red, white and blue striping on the upper and lower surfaces of their elevators, a practice that persisted on aircraft built by Wm Beardmore & Co until the end of the war. On aircraft already marked with red rings, the addition of a blue centre disc was provisionally allowed – thus some RNAS aircraft appeared to display French *cocardes* – whilst French machines purchased for the RNAS simply retained their French markings.

In February 1915 it was 'suggested' that the



Short Admiralty Type 830 Seaplane 1335 was built at Eastchurch. This, the first Short Seaplane to be camouflaged at the factory, was delivered in May 1915 and served at the RN Air Station at Great Yarmouth.

RAF identification 'colour varnishes' be used instead of the proprietary Ripolin and Rystolite paints used on aircraft built by private firms. It was noted that, although the intensity of the RAF's VB.2 blue and VR.3 red varnishes was 'not so pronounced' as those of the proprietary paints, they dried in about 30 minutes instead of two to three days, and the proprietary oil-based paints could not be overpainted in service with the Factory's nitro-cellulose varnish and needed to be stripped before refinishing.

By the end of the year the markings on virtually all British Service aeroplanes in France conformed to the instructions but those of training, reserve and experimental establishments in the United Kingdom, or used during the Dardanelles campaign and in Mesopotamia were rarely repainted.

At this time, RFC aircraft generally remained in clear doped finish, those of the RNAS were variously finished in clear dope, light grey overall or in disruptive 'white' and grey 'wave-pattern' camouflage.

During the early months of the Battle of Verdun, March-April 1916,

with Gris-vert or Vert-olive clair were applied to upper surfaces of fuselage and wings, the *cocarde* omitted. The colours were soon extended down the fuselage sides.

The Germans, who had earlier used a light grey printed fabric to make their aircraft less visible, soon began to apply large scale disruptive camouflage to their machines, usually of olive green and 'red brown', but after a number of their aircraft had been mistaken for French machines, despite the well-defined national marking, a cross patee on a white ground, *Idflieg*, the *Inspektion der Fliegertruppen* (Inspectorate of the Flying Services) on 12 April 1917, required 'lilac' to replace the brown. Both the German schemes were soon to be superseded by the use of fabric printed with large regular or small irregular polygonal patterns of four or five colours, clear-doped and matt-varnished.

On British aircraft, plywood fuselage panels were still finished with clear exterior varnish but this was considered unsuitable when damaged panels were repaired and it was proposed on 24 April 1916 that the engine cowlings of tractor aeroplanes and the nacelles of pusher aeroplanes be painted 'dull



Nieuport 16C.1 Scout built for the RNAS and taken over, as 5172, by the RFC at St Omer in April 1916. This aircraft, in French mimetic camouflage, served with Nos.1 and 60 Squadrons.

aircraft, in 'dull green', but five days later the instruction was corrected; the finish was to be 'dull grey' – presumably BS colour X.22 battleship grey oil-resistant paint. Those aircraft already painted on metal parts with the 'usual mix of green and brown known as service colour' were not to be changed.

When a number of Nieuport Scouts purchased in France for the RNAS and finished in two-colour mimetic camouflage were transferred to the RFC, they were allowed to remain 'as received from the makers' but were marked with

observation posts could recognise the aircraft with which they were to operate. These markings, consisting of black stripes and bands, were to be painted on the top, bottom and both sides of the fuselage in easily-removed temporary paint made from lamp black mixed with turpentine, gelatine or glue.

Continuing experiments and trials at the RAF, at last, convinced the War Office of the need to protect fabric from sunlight with a 'protective colour varnish' developed at the Factory. From mid-1916 aeroplanes sent to France for operational use were finished on upper and side surfaces with 'protective covering', a pigmented dope regarded as primarily a means of preserving the fabric. Two colours were specified: PC.10 (called khaki, khaki-green or service colour), mixed from yellow ochre and raw umber with small proportions of lamp black, blue and red-oxide, was used on RFC aircraft on the Western front. The War Office consistently refused to accept any need for camouflage finish on aircraft, so it may be presumed that the choice of colour by the RAF was influenced by a requirement to conceal as well as to protect the airframes. It could hardly be coincidental that the recommended colour resembled the Factory's earlier D.8 or the standard khaki-green applied to all War Department stores. The official view of Headquarters, RFC in the Field, was later firmly stated: 'both the French and German systems of camouflage make aircraft less easy to recognise, but not appreciably less easy to see in the air. There is little to choose between the two systems. We do not consider the use of camouflage justified'. This, it



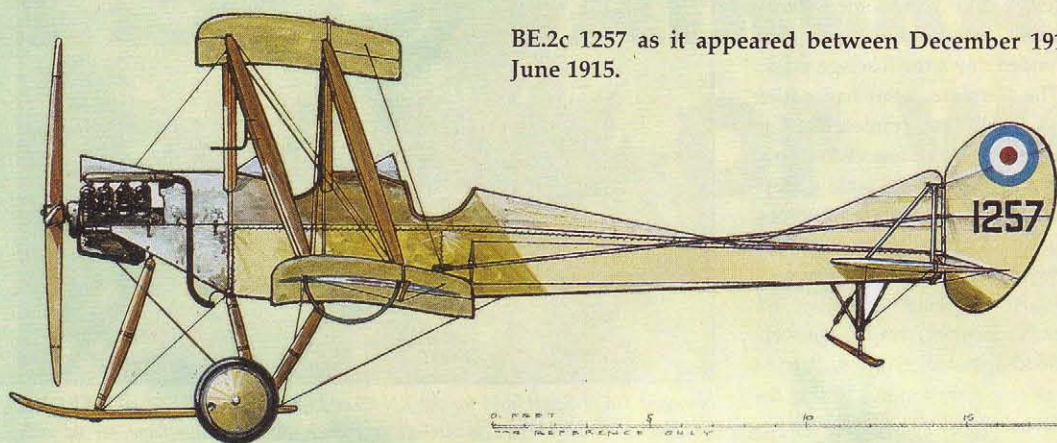
Vickers FB.9 Gunbus 7826, built by Wells Aviation Co Ltd. The plywood nacelle panels were painted grey; roundels were of non-standard proportions.

a *schema mimétique* was approved for aeroplanes of the Aviation Militaire, to hide them from enemy aerial reconnaissance when on the ground. Two colour disruptive patterns of Brun havane or Vert-moyen

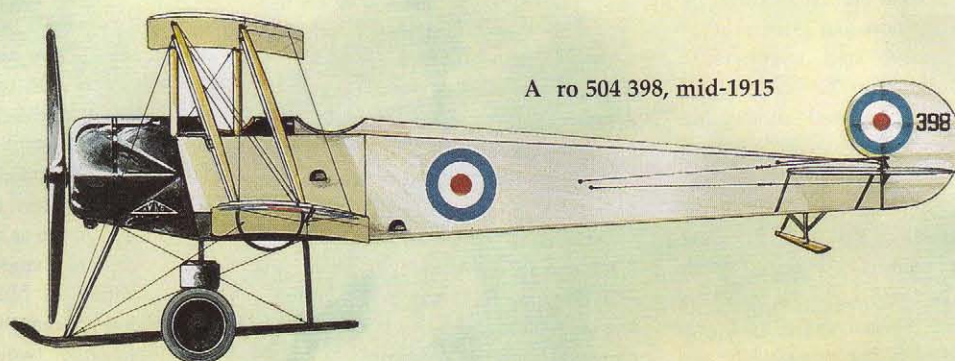
service colour' (i.e. standard Army khaki-drab), except on the Vickers Gunbus biplane series. From 15 May, this finish was to be extended to the engine cowlings and steel undercarriage parts of all British

wing and fuselage roundels.

From April 1916, squadron identification markings were applied to the BE.2c Corps squadrons of the RFC on the Western Front, soon to be 12 in number, so that ground



BE.2c 1257 as it appeared between December 1914 and June 1915.



Aro 504 398, mid-1915



Nieuport 12 8731 of No.2 Wing RNAS on Mudros in November 1916. This aircraft, flown as a single-seat fighter, was finished in Cris-aluminise and retained French markings.

may be assumed, referred to the use of disruptive-patterned camouflage.

PC.10 was specified for application to aircraft designed and developed at Farnborough primarily, but not exclusively, for the RFC. It was required to be used by contractors licenced to build the RAF aircraft (the BE, FE, RE and SE series) and recommended for use

on other makes of aeroplanes.

An alternative, PC.12 (red-brown), in which red-oxide replaced the yellow ochre, provided even better protection. This colour was used on most aircraft ordered for the RNAS and on RFC aircraft for service in the Mediterranean area and the Near East. In both cases, roundels were usually outlined white.

In July 1916 several doping schemes developed by private firms were given approval and the material was produced in large quantities under the trade names Armoid,

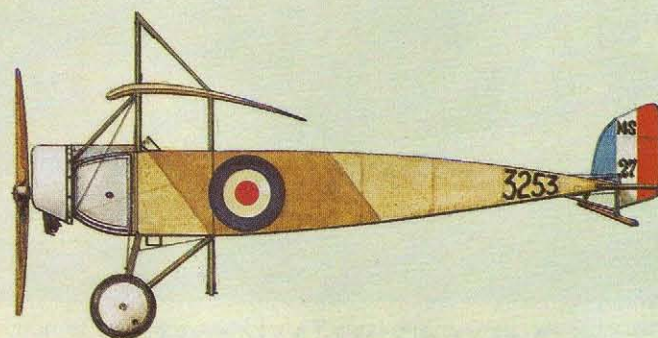
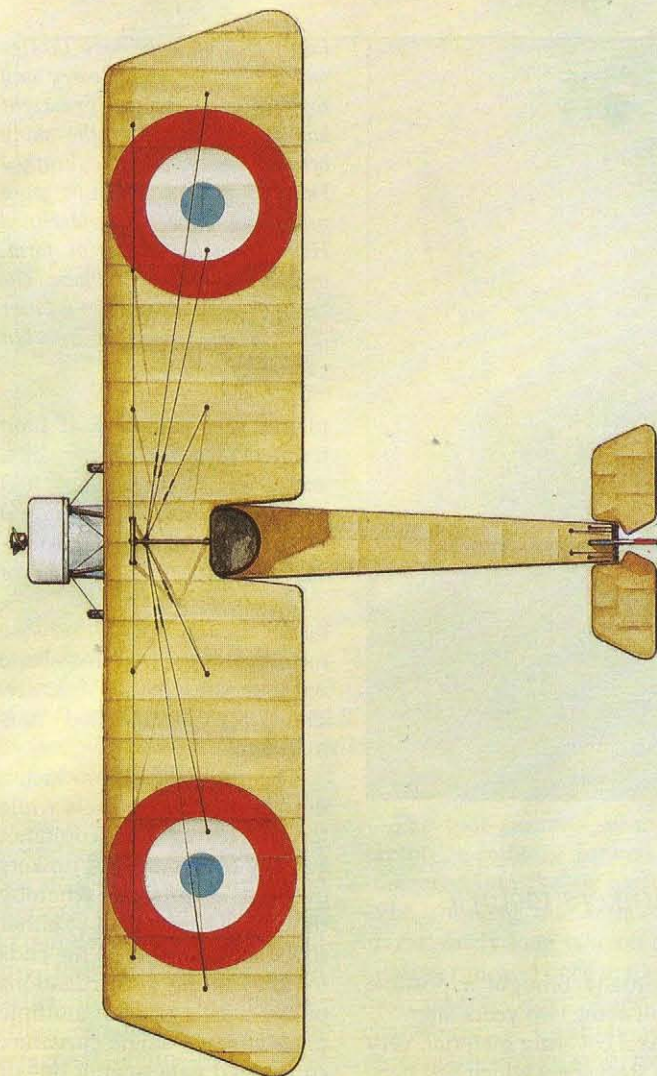
Cellon, Emailite, Novellon and Titanine, as alternatives to the Royal Aircraft Factory's Scheme A. This consisted of six coats of Raftite (RAF tightening dope) and two coats of the pigmented dope. The demand for the new finish, coming at the same time as an increase in aircraft production, far outstripped the Factory's resources and private manufacturers were quick to offer alternative pigmented doping system, differing in their constituent materials so as not to infringe government patent rights.

When these firms were autho-

rised by the War Office to produce the two RAF colours under licence, methods had to be approved by the Factory for application of all the protective covering schemes and, on 4 August, standard samples for PC.10 and PC.12 were distributed.

There is no doubt that the finishes produced by the private firms often differed from these standards after exposure to the weather and to sunlight. The proprietary oil-based paints generally used for markings were mostly superseded by the Factory's fast-drying nitro-cellulose varnishes, VY.1 yellow, VB.2 blue, VR.3 red and VW.4 white.

As the number of aircraft in service and under repair in France increased, another problem had arisen. It was observed that the part of the roundel painted on the main-plane surface often did not coincide with the segment painted on replacement or interchanged ailerons. On 8 May it was decided that the national markings must henceforth be applied precisely to specific positions and dimensions



Morane Monoplane L 3253, late 1915



Bristol Scout Cs of No.1 Wing RNAS at St-Pol, Dunkirk, in the RNAS markings of late 1915. All the aircraft carried serial numbers on the rudder surfaces; the aircraft in the foreground was fitted with a replacement rudder with RFC style blue, white and red stripes.

on each type of aircraft and that 'spare flaps' should be supplied unmarked, to be painted only after attachment to the wings. On 2 June authority was given for drawings, precursors of the post war Air Ministry 'Air Diagrams', to be prepared for manufacturers and repair

and salvage depots, showing standard positions for markings. These drawings were issued by the Military Aeronautics Directorate of the War Office on 21 August 1916.

Meanwhile, on 19 July another identification marking had been introduced. The Morane 'Bullet'

scouts, the only monoplanes in service with the RFC in France, were too frequently mistaken in the air for the enemy's Fokker E.III fighters, although the two types were dissimilar in silhouette. Captain Smith-Barry, Officer Commanding

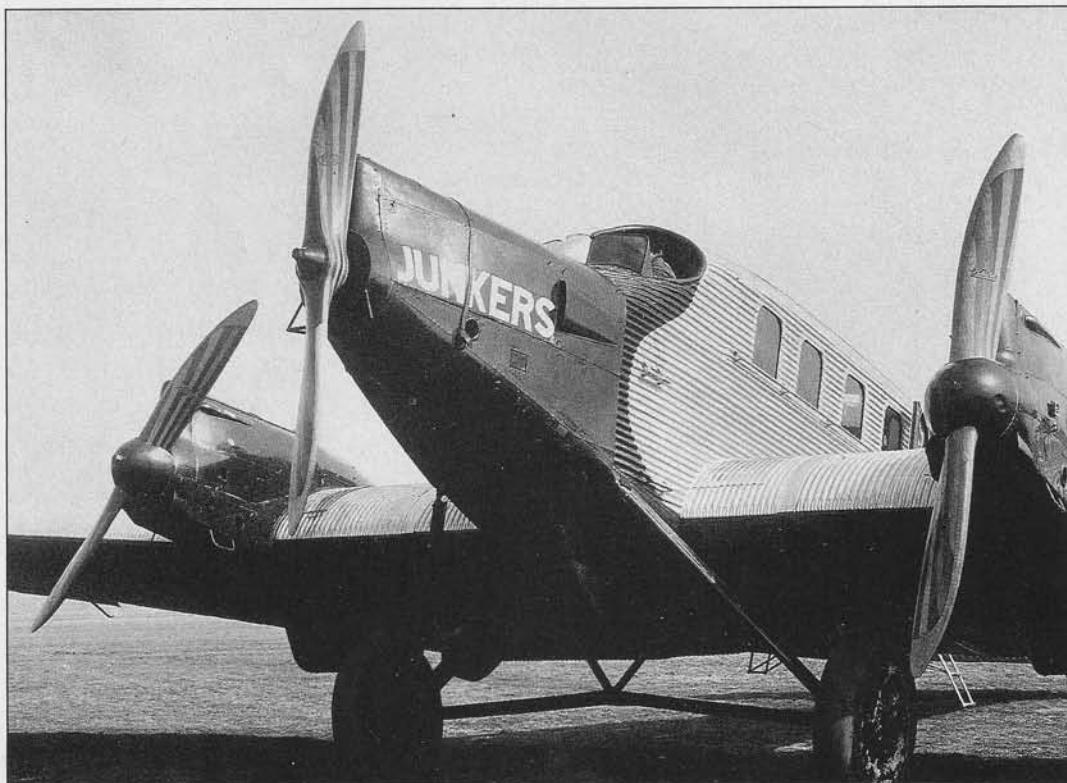
Morane scouts of the RFC were to have 'metal parts', engine cowling and spinner, front fuselage panels, struts and pylon, as well as the fabric wheel covers, painted red to distinguish them from the Fokker monoplanes.



Morane Type N 'Bullet' A186, showing the metal components painted red. Upper surfaces were probably vert-olive clair.

No.60 Squadron, was instructed to try out different colours on his squadron's Moranes. As a result, all

The first part of this article appeared in *Scale Aircraft Modelling* in July 1994.



Front end of a Junkers G24/je which appears not to carry any registration. Seven or eight laminations make up the shiny brass leading-edged sheathed Heine propellers. The two wing propellers have an underlined Heine transfer in script form, probably in gold and black. The central prop has upper and lower case lettering, not underlined but in an elliptical frame.

ALL-METAL JUNKERS

Ian Huntley investigates the methods used by the Junkers factory between the wars

IN Germany welded steel tube was a very early airframe development for fuselage construction which easily replaced wooden structures, but still enabled fabric covering to be maintained. Anthony Fokker made much use of this method of construction, while the Firma Junkers & Co of Dessau, under the control of Professor Hugo Junkers, sought many ways of developing an all-metal aeroplane.

Thin gauge steel sheet of

various kinds had been experimented with from the mid-1900s by several aircraft constructors, all trying to find ways of obtaining stronger and more flexible airframes, but with little real success due to the weight of the metal and its ability to corrode very quickly.

In most respects hard grades of aluminium sheet fared much better but these had little strength, though the experiments with alloys of aluminium as carried out by the Duren Metal Co from 1908

eventually brought a positive result some two years later.

As a covering material, very thin steel sheet which had been stiffened by dimpling, or slight corrugations was not successful at that time, but steel pressings for fuselage frames and wing spars had a little more success. However, it was not until a Duren hard aluminium alloy having the name Duralumin (Dural for short) emerged that very thin sheets of this new material provided a partial answer for airframe coverings.

Even then, early attempts at straight covering (as would be the case for plywood) the supporting structure underneath became far too heavy. However, the ply-monocoque activities of the Albatross-Werke GmbH of Berlin-Johannisthal brought forth the idea of forming the of Dural sheet as a partially self-supporting shell. Thin sheets had longitudinal flanges and rib lines pressed into them which gave single curvature strength, but meant that only slab-sided structures could be built.

Dural was a difficult material to work, as it could not be formed cold. It had to be

placed in a salt bath at high temperature for some time, and then quickly quenched which rendered the material temporarily soft, if often misshapen, for a brief period of time during which it could be bent, folded or otherwise formed into the required shape without the risk of fracture. The process was called 'normalizing'.

The problem of producing double curvature panels while forming corrugations could not be fully overcome, but Junkers evolved a process whereby thin Dural sheet could be either rolled and pressed on the ends to form straight corrugations on flat panels, or with multiple pressings into single curvature corrugated panels, after one or more 'normalizing' salt bath treatments.

This experimental work seems to have been started early in 1914, aiming to try out the most difficult part of construction: a fuselage. Efforts were made to produce an aerodynamic shape, parallel sided in plan (having a blunt nose and sharply tapered rear end), and with the least amount of double curvature in profile, all based on a steel tube inner structure.

During December 1915 the first all-metal cantilever monoplane emerged from the works in the form of the prototype Junkers J.1. This machine took to the air on the 12th of that month.

However, plans seem to have changed during 1916, when the experimental work was redeveloped into a more functional form as a warplane. The fuselage redesign was along similar lines, but initially the overall design was to have been evolved as a parasol configuration, monoplane type as the military Junkers type J.1.

Down to midget size, the Junkers A50/ce (c/n 3505), Junior, two-seat monoplane, prior to being registered. It features a red Junkers triangular trademark on the rudder.





From the sublime to the ridiculous! The A50, alongside the massive four-motor G38 (D-2000) as yet without a proper finish. The 30-plus feet span of the former is dwarfed by the 144 ft span of the latter. This photograph was probably taken at Dessau some time after the first flight of the G38 on 6 November 1929.

There were many intermediate considerations, however, and one of the ways of easing the demands on the press shop was to introduce a nose and cockpit area formed from flat metal strip with single curvature covering, stemming from an octagonal engine-front plane and covering the rear half of the fuselage in fabric, leaving only the one-piece wing and the tail surfaces to be skinned with corrugated Dural sheet.

Armoured warplane concept

Later, plans seemed to have changed again, for the idea emerged of making the forward flat plate skinning and engine cowling from 5mm armour plate. This move evidently brought fears about overweight as well as main undercarriage mounting problems, and a further redesign introduced a short-span ventral centre section to which a fairly wide track undercarriage could be attached, bracing it back up to the fuselage structure and also providing attachment points for outer wing panels, thus converting to a biplane design.

Fears of a lack of lift was no doubt behind that move, but as it happened the lower wing panels were quite minimal in span on the final count, making the design more of a rather cumbersome sesquiplane type.

The (not entirely) all-metal prototype military Junkers J.1 staggered into the air early in 1917, showing that it needed an extremely long take-off and landing run, and once in the air had rather heavy handling characteristics. Controls were particularly heavy and much longitudinal wander was met with in gusty conditions. But the 50 ft span monster flew, if only powered by a 200 hp Benz BzIV, water cooled in-line six cylinder motor!

Production plans included several modifications, the most prominent being an increase in fin area, and overhung, aerodynamically balanced ailerons and rudder, the former adding some two feet extra to the upper wing span, and the first machine was ready circa October 1917, after which some 227 were produced with manufacture being shared between the Junkers, and Fokker factories. The 230 hp high-compression Benz motor was also introduced (having aluminium pistons).

After unit work-up the first service introduction was in January 1918, where in the right hands it became a most effective weapon, as an 'armoured trench fighter', a name seemingly invented by the then new Air Ministry, having made a report on a captured example, and hoping to get airframe parts back to

the UK for further evaluation.

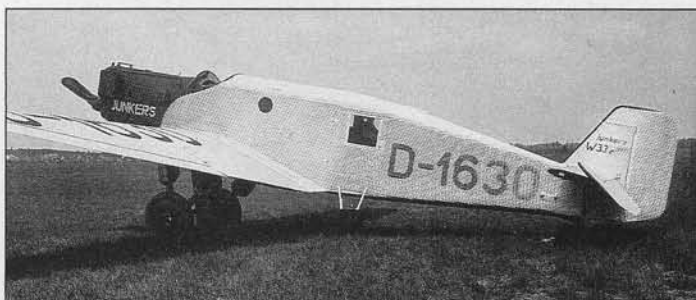
As it was in its original form the J.1 had two fixed Spandau guns firing through the cockpit floor on the port side of the machine, pointing in a forward direction at an angle of about 45°. Each gun had about 550 rounds of ammunition carried on a rotating drum. The observer in the rear cockpit had the usual rotating mounting carrying a Parabellum machine gun. Later attempts were made to fit two further movable rearward firing guns pointing down through the flooring, but the speed and low level passing made accurate aiming almost impossible.

As a war machine the Junkers J.1, which earned itself the nickname *Mobelwagen* (furniture van), achieved both technical and military success, and the company went on refining and developing the corrugated Dural skinning process along with lighter weight basic tubular internal structures. The latter enabled finer-gauge Dural sheeting to undergo the corrugation pressing process, which to some extent could cater for partial double curvature panel working.

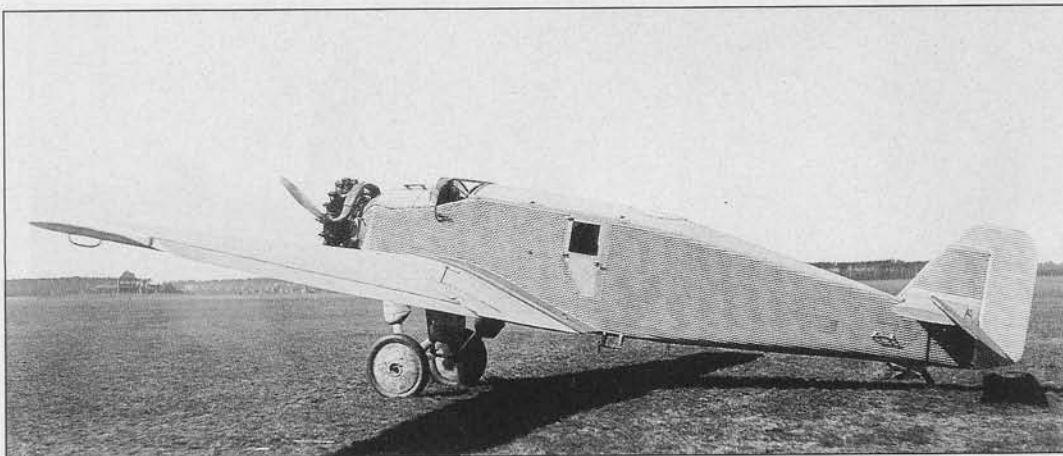
Where fuselage covering was concerned, long flimsy strips of panel work were riveted both to the structural members and to the next adjacent panel by longitudinal overlapping joints. It was not necessary to retain slab-sided rectangular cross sections any more as an elliptical section could be constructed if required, although at first use was made of large-radius meeting edges at the junctions of decks and sides.

Such aircraft, while looking somewhat ungainly, were immensely strong and required little or no maintenance compared with other methods of construction. Greater use of space inside a fuselage could also be made, making the method very suitable for passenger-carrying machines.

As for monoplane designs, much thought went into producing a strong cantilever wing (almost unheard of in 1918), necessarily resulting in an over-thick section, partly from the point of view of strength and partly to induce a section shape with a powerful lifting action. Whatever the bulky appearance, where other



A single-engine W33c/2535, D-1630, in the characteristic finish.



manufacturers' monoplanes frequently came apart in the air, that could not be said of the Junkers designs.

From war to peace

The military Junkers types comprised a series of designs from the J.1, to the J.10 (military designation CL.1), all except the J.1 being monoplanes, which was another technical advance where others continued with biplane wooden and fabric designs (some even continuing into the early 1930s).

The military types were given camouflage, usually of a fine oil-based synthetic pigmented medium. Paint was necessary as the Dural sheeting could quickly corrode if left unprotected. The colours used were a dark green, a medium purple, with pale blue for the undersurfaces.

For Junkers, the main aim of development was to use thinner gauge materials and finer corrugations where small two- or three-seat commercial aircraft were concerned. The corrugations were often on a single panel, going through several pressing stages (with normalizing taking place several times), so that the whole of a panel was well covered with

corrugations right up to the narrowly flanged jointing edges. In order to cut down turbulence caused by the blunt bulge at the start of an individual corrugation, press tools were made which put a triangular indentation in the start of the bulge, which in effect produced a smoothly tapered start.

Forbidden to produce military designs by the Allied Control Commission, most German airframe manufacturers devolved into 'civil' aviation. This was generally accomplished by stripping down ex-military machines and inserting a wicker seat or two behind the pilot, making a ply/fabric windowed hooding to sit over the fuselage decking, and matching the basic airframe structure.

Junkers, however, sought to produce the first all-metal commercial aircraft by adapting the rear cockpit on a military CL.1 (J.10) to take an enclosed and windowed metal hood under which two passengers could be seated (giving the aircraft a humped 'camel-back' appearance). The pilot sat behind the standard windscreen of the original open cockpit.

That experiment appeared to work well bringing the design

team then led by Dipl Ing Otto Reuter to consider custom-designed commercial airframes in all-metal. Adaptions continued through the J.11 (later dropped) and the J.12 which was no more than a very much modified J.10, and remained as a project drawing only. This in turn led to the slightly longer, larger and wider-fuselaged model J.13 design early in 1919, which could take two side-by-side bench seats under an enclosed cabin and all within the smooth contours of a cabin monoplane, to which Hugo Junkers gave a construction go-ahead.

By this time, steel tubing for the basic structure was being overtaken by Dural tubing, which in many cases was no longer bolted together but had been successfully welded. Although this saw an increase in multiple wing sparring (up to nine for the model 13), it meant even greater strength for less weight. Wing ribs were made up in a similar style with an outline of tubes forming an approximate aerofoil section (they were later replaced with flanged dural segments with lightening holes). To these were added supporting and strengthening cross tube mem-

Another type similar to the W3, an unmarked BMW Hornet powered W34/1. Here some attempt has been made to fit a more substantial framed wind-screen, but the cockpit is still left open above. No aluminium finish has been applied looking at the dull appearance.

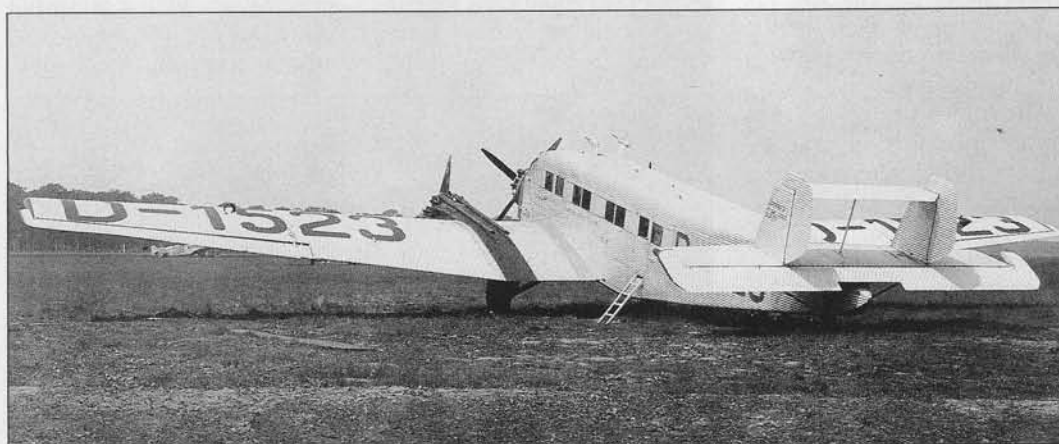
bers. Lugs welded to the tubing (or the flanged segments), formed attachment points for the pre-formed corrugated skinning, which when in position completed the precise aerofoil section.

Attempts were made to introduce aerodynamic styling to this prototype, soon to be known as the Junkers F.13. This meant upward curving of the decking over the front open pilots cockpit to provide plenty of headroom in passenger compartment. The two crew each sat within an elliptical opening which afforded them some slight protection above and behind their heads. The four passengers sat facing each other in pairs, and continued the military strategy of wearing seat belts. Strangely, and not according to expectation, slipstream air did not rush into the two 'fisheye' openings of the pilots enclosure in quite the force of a fully open cockpit, possible because of the deflecting influence of the small windscreens on the decking?

Enter the pioneer all-metal construction airliner

The F.13 prototype took to the air on 25th June 1919. Initially powered by a wartime 160 hp Mercedes D.IIIa motor, it had a maximum speed of some 80 mph, could reach about 12,000 ft, and with a four-and-three-quarter hour endurance.

This pioneer achievement slipped almost unnoticed into the history books, but on 13th September 1919, possibly the same (modified) machine carrying eight persons flew to a height of 22,145 ft, actually an



Bigger still, tri-motor G37/f D-1523 (c/n 3005), with all radial motor power. Centre motor drives a four bladed prop. Wing motors, have two-bladers. In the background under the port wing can be seen two F13s, the nearer being registered D-282.



international class record, which the FAI did not recognise as Germany was at that time excluded membership. German newspapers hailed it as the 'Wunderschon Leichtmetall-Flugzeug von Junkers'!

The prototype F.13 had been quite difficult to build, and a less sophisticated production design was drawn up, powered by an 185 hp BMW IIIa six-cylinder in-line engine. This improved the performance of the machine greatly, giving it a cruise speed of 87 mph, at 13,000 ft, with a five hour endurance.

With production soon in full swing, F.13s were also constructed in foreign-based factories and the type became very widespread in its use. Estimates of total production have been varied. The latest estimates produced by MBB (which incorporated the Junkers concern), considered that at least

350 of various versions of the F.13 were built.

The identity of the prototype F.13 remains something of a mystery. It was thought to have been registered in the alpha-numerical civil aviation registration system as D-183, and was later put to use with the Junkers Luftverkehr Transportbau, initially on services between Dessau and Weimar. It was said to have borne the name Annelise on the cowling. Other references, which are believed to give the correct version, assign a different registration and the name Herta – this was the name of Professor Junkers daughter.

The Junkers company, in a like way to Boeing, having formed their own air transport company it was eventually running parallel to what became the national airline Deutsche Luft Hansa (which later became Deutsche Lufthansa).

Junkers F.13ge R-RDAU (c/n 2035), in the smart non-leafing aluminium pigmented lacquer finish, topped off with gloss black lacquer trim. Lettering on light areas is gloss black, whilst on the cowling and black undersurface the lettering is in aluminium. There is a weight data, etc. panel in small black characters below the tailplane. Polished aluminium, with gloss black infilling data plates can be seen on the undercarriage struts, and other major airframe components. '2035' is also signwritten on the undercarriage springing fairings. Note contrasting laminations of the highly varnished or polished prop.

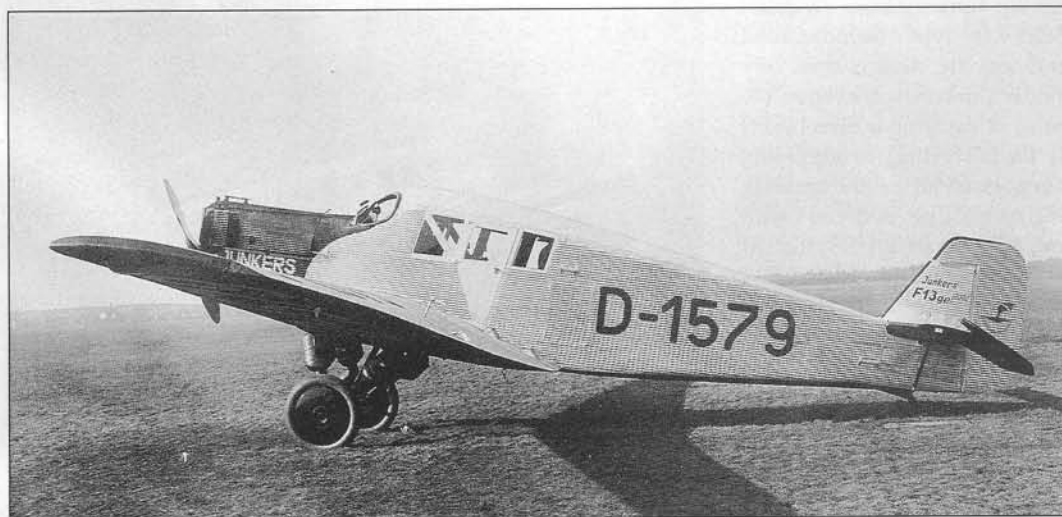
Further developments

Under the auspices of the expanded Junkers Flugzeug und Motorenwerke AG, the next stage was to scale up the F.13 to create a larger passenger cabin, using the same materials and methods of construction in a design designated G.3: this first flew in October 1924. Why Junkers did not go first to a two-motor design is not quite clear. It was said that it hoped for a new single 300 hp BMW engine, or indeed their own 300-plus hp engine in the first instance, but neither was ready, and in falling back on its own

195 hp L2 engine, had to produce an increase in power by using two war surplus 100 hp Mercedes D.IIIa engines, one on each wing.

The G.23 had a span of 92 ft 6 in and flew little faster than the F.13 until it was re-engined later. The design did not go into full production, being overtaken by the G.24.

The prototype G.24 flew in July 1925 and carried two crew plus nine passengers, who were accommodated in armchair comfort. Of some 96 ft span, it also carried a toilet and a small baggage compartment, and was powered by three 310 hp Junkers L5 engines. It cruised at 103 mph at just over 6,000 ft and had a range of about 700 miles. Like the F.13, a variety of different power units could be fitted,



Similarly painted F13ge (c/n 2032) D-1579 in what might be termed an early Luft Hansa scheme. Aluminium data plates can again be seen on the undercarriage members, below the fin, and on the end tailplane rib. A data table is below the tailplane. What appears to be a picket ring hangs below a wing spar.



and probably some 70 machines of the type were built. Approximately ten G.24s were converted to F.24s by clipping their wings and converting to a single engine. One new F.24 was built to become a test bed for the Junkers Jumo engine.

Meantime development of the F.13 continued with the 60 ft span W.33 and W.34 all-purpose monoplanes with in-line and radial engines respectively. Many of these types were either quasi or even genuine military airframes, mostly for foreign air forces. The prototype W.33 (D-921) first flew in February 1926 and was a straight conversion from an F.13. About 190 W.33s were built up to 1934 and, with the more versatile W.34 which first flew in July 1926, the number produced exceeded 1,795, including the military K.30 and K.34 versions. All versions could operate with wheel, float or ski undercarriages.

Two W.34s were prepared during 1927 to make a non-stop first aeroplane east-west crossing of the Atlantic. D-1167 *Bremen* and D-1197 *Europa* were fitted with boosted Junkers L5G engines, and carrying 660 gallons of fuel. They took off from the Dessau works on 14th August 1927, but were forced to retire because of bad weather. Eventually D-1167 made the 37-hour crossing on 12-13th April 1928, flown by a crew of three led by Baron von Huhnfeld. They took off from Baldonnel in Eire, crash land-

ing next day on Greenly Island, Labrador.

Further offshoots

The popularity of the F.13, W.33 and W.34 types led to the production of further variants. As an enlargement from the G.24, came the G.31 tri-motor type, fitted with 525 hp, or 700 hp BMW Hornet motors. This type of which some 40 were built was virtually a forerunner of the Ju 52 bomber/transport, and Ju 52/3m transport types first flew in June 1926.

In between these aircraft came the giant Junkers G.38. It was intended to be the start of an 'all-wing' (Nurflugel) programme which was Professor Junkers' dream ideal. He came very near to it with this 144 ft span design brought to fruition by Dipl Ing Ernst Zindler during 1928, with the first of the series – D-2000 – flying from Dessau on 6th November 1929. Eventually powered by four 775 hp Junkers L88a 12 cylinder, vee type liquid-cooled engines, the design was very modern in concept, even to the point of carrying a diesel APU (in the port wing) for supplying compressed air for the braking, engine starting, and fire extinguishing systems. Flying at over 115 mph at below 8,000 ft, it had a range of nearly 2,200 miles, or 20 hours' flying. So deep was the wing that workstations, fuel, and part of the 30-34 seat passenger accommodation was installed within it.

Freight compartments could

hold up to 6,614 pounds, while part of the fuselage space could convert to sleeper bedsets. A second G.38 serialised D-2500 was built and both were subsequently taken over by Luft Hansa during 1931. D-2000 was named *Deutschland* and D-2500 *Hindenburg*, the latter becoming Generalfeldmarschall von Hindenburg, in April 1933. Shortly after that time all letter registrations were introduced, and the two became D-AZUR and D-APIS respectively.

Flying on a number of European routes and frequently undergoing minor modification and the installation of different engines from time to time, D-AZUR was lost in a take-off crash at Dessau in 1936 following an engine change. I also remember some fear and trepidation watching the second machine take-off from Croydon and pass almost overhead, a sensation only matched by that caused by the

A virtually unmarked F.13/w (wasser) fitted with floats, and powered by a Pratt and Whitney, but BMW built Hornet motor, driving a (ground) adjustable metal propeller. Perhaps because of spray, the usually open cockpit aperture has been filled in with a sheet of Cellastoid. In this particular case it looks as if the skinning has received anodic treatment? Only the float and struts having received the black lacquer treatment.

772 ft long, 100 ft diameter, Graf Zeppelin LZ127, rigid airship passing overhead low on a landing approach at Hanworth a few years later.

By complete contrast

Junkers went into the light aircraft field with its A50 Junior, two-seat, low-wing monoplane, which often posed under the wings of the G.38. Powered by a 160 hp Siemens five-cylinder, air-cooled, radial engine it was an extremely attractive, and sporty looking machine, having a 130 mph maximum speed, at 15,000 ft; a 600 mile range, and was fully aerobatic. Its only drawback was price: it was more expensive than the large range of Klemm types available but, unlike them, required little or no airframe maintenance.

The prototype first flew in 1928, was eventually registered as D-1842 (it is thought), when as an A50/ce (c/n 3505) after previously being unmarked.

Whilst these aircraft were being developed various updated forms of the F.13 were taking shape. These included the Ju 46 single-motor types operated with a variety of radial motors. During part of 1932, W.34 D-2771 (another *Bremen*), operated



Bigger and better. Trimotor G.24/ge D-949 (c/n 917), this time with Luft Hansa on the cowling. Note the gloss black leading edge to the fin and rudder.



a mail service from the Norddeutscher-Lloyd line's North Atlantic liner of the same name. Catapulted whilst at sea, the aircraft raced ahead with mail landing at Cherbourg, whereby the mail was forwarded by express mail train. Sister vessel *Europa* also operated a Ju 46 in a similar way.

Ultimate F.13 development

It is perhaps stretching a point, but the ever-increasing size of the developing original finally became the Junkers model Ju 52, which was designed as a single-engined bomber/cargo transport, expanded from the K.30 design – the prototype D-1974 first flew on 13th October 1930, powered by an 800 hp Junkers L88 engine.

After several of this type had been produced, the seventh was turned out as a trimotor fitted with three 575 hp BMW Hornet engines, and which took to the air on 5th April 1931. Proving an instant success, all subsequent machines were finished in a similar form. Production totals both inside and outside Germany were gigantic, with Lufthansa alone having some 231 aircraft listed in its fleet. Overall production to 1944 mounted to some 4,485 machines, with over half that number coming from German factories. Such were the Luftwaffe numbers in service that up to 600 of the were engaged en masse in the invasions of Norway, and France.

The colourings of Junkers types

The following paragraphs deal

with the civil colourings of the series and, as explained earlier, Dural sheet needed protection from rain and condensation. The best method was an anodic bath treatment which yielded a semi-shiny grey effect which was not necessarily uniform for all parts. Whether all Junkers parts were so treated is not known, but in order to achieve a bright and attractive finish with early F.13 types were given a non-leafing aluminium powder pigmented lacquer finish, over the whole basic airframe. Registrations and other marking was in a gloss black lacquer finish.

Propellers continued to be of laminated woods, and were thus clear varnished or french polished in a similar way to the wartime standard. Most carried manufacturers' brightly coloured transfers on the front face of each blade.

It was soon noticed that exhaust deposit quickly blackened the bright silver finish, as did mud spraying up from landing wheels. Oil could also ooze back from gaps in cowlings panels, so to overcome this state of affairs cowlings, and the undercarriage and wheel members were black lacquer painted.

After brief usage, the complete undersurface of the airframe was painted in gloss black. Under the wings the registration was remarked in white gloss lacquer.

The undersurface black was soon extended to cover the tips of the wing and tail surfaces as well as the leading edge of the fin and associated part of the rudder balance area and tip.

The fin also became a place for putting type details, while the rudder carried either a single registration character, or makers or airline motif.

With the multi-engine types the original black nacelles and cowlings were later extended back in a broad chordwise band down to the trailing edge of the wing. Walkways were also painted with a non-slip black coating or had specially moulded black rubber matting affixed to the wing surface. By the mid-1930s weight and constructional data was stencilled as a block below the tailplane on the port rear fuselage. The upper area of the fin and rudder was marked with encircling horizontal banding in descending order of black, white and red.

The policy was adopted quite early on that as well as carrying the airline name, each aircraft should carry an individual name of some kind, the latter in a very large and prominent style marked in gloss black on the silver, or white on a black area – this was usually a regional German name or that of a well known personality.

Following the rise of the Nazi Party after 1935, the swastika was marked as a separate small block on the rudder. Usually it was a red square containing a white disc, upon which was set the black emblem at a 45° angle. This move was much resisted at first, but it soon became a requirement to have as large as possible form of the marking, which took over and replaced the striped banding on the port

Rather soiled G24/ge (?) D-963 without the full paint scheme, which shows up the deposit coming back from the wing mounted motor. This type has a much enlarged fin. The unknown photo plane is registered D-908.

side of single finned aircraft, or the port face only of the port fin and rudder of twin-finned aircraft.

That led to much confusion and some twin-finned aircraft had swastikas on the outer faces of the fins and banding on the inner faces. As a result, an order soon followed that swastika markings should appear on both faces, regardless of whether the aircraft was of single or twin-finned configuration.

Footnote

The original Junkers J.1 was a purely civil type evolved by Professor Junkers based on his patent of 1900, that is the idea of a load-bearing metal skin which, if formed into an aerofoil shape, would yield a true cantilever wing with the minimum of internal support. With the war in progress, he was forced to drop further work, and progress into military airframe development. All follow-on designs at Dessau were given factory designations in the form J.2, J.3, J.4, etc.

Whilst the military were not too impressed with monoplanes, his attentions were diverted towards a biplane all-metal design based on a factory designation of J.4, which was given a military designation of J.1. This biplane machine took to the air early in 1917, and is not to be confused with the original J.1. Fortunately, many other military monoplane prototypes followed, including the (factory) J.7, from which the single-seat D.1 fighter stemmed enabling development of the construction patent to be perfected.

Factory design J.10m saw a two-seat ground attack/escort machine evolve, which was given the military designation CL.1. The prototype flew on 4th May 1918, and in post war terms details from that design were incorporated back into the F.13. ■

A-10



FAIRCHILD A-10A "WARTHOG"



The A-10 was originally designed to be the successor of the venerable A-1 Skyraider and newer light-weight OV-10 Bronco in the jungles of Vietnam. In reality, it was suited to operations in all corners of the world, and made its name in the tank-busting role during Operation Desert Storm. Ironically, plans to withdraw the aircraft were mooted before the Gulf War, but the A-10's fine performance in that arena secured it a stay of execution.

The Attack Experimental programme which culminated in the A-10 was aimed at producing a simple aircraft capable of carrying a large quantity of weaponry while retaining superior low-speed handling. This latter quality produced a further requirement – good armour plating to help the aircraft survive in the battlefield environment. The successful AX competitor was to require a maximum take-off role of 4,000 feet, a figure reached following investigation of airfield damage inflicted during air strikes.

At the time of the programme's launch in



At first, European-based A-10As were finished in grey colours, as seen on 77-0242/WR of the 81st TFW at Greenham Common in 1982. (Sue J Bushell)

1966, a twin-turboprop machine was seen as the eventual result. When the proposal was launched on 6 March 1967 the USAF approached no fewer than 21 manufacturers. Sub-programmes were simultaneously launched to research the armour plating required for the aircraft – to protect not only the pilot but also the fuel and hydraulic systems.

Work on refining the AX specification continued throughout the remainder of the decade, by which time the weight of the aircraft had been reduced to 35,000 lb and the unit cost fixed at \$1 million per aircraft. Turbofan engines were now seen as the powerplants for the AX. Further refinements led to the aircraft requiring a combat radius of 250 miles, including a loitering capability of two hours, and a bomb load of nearly four tons. Maintenance on the front line was to be easy to accomplish, considering the primitive conditions and facilities from which the aircraft would operate.

By 7 May 1970 the USAF was ready to issue competitive prototype requests for proposal. The programme was based on 600 aircraft at a unit cost of \$1.4 million. Half of the dozen companies approached replied with their proposals, and two of these were judged to have won the competition to build prototypes.

Each of these two companies – Northrop and Fairchild-Republic – were given contracts to produce two prototypes each. These became the YA-9 and YA-10 respectively on 1 March 1971. The YA-10 first flew on 10 May 1972, just beating the YA-9 into the air: the latter took to the skies on 30 May 1972. Both types made their first flights from the USAF facilities at Edwards AFB, California, although they were flown by the respective company test pilots.

Competition formally began on 10 October 1972 and continued for two months, during which time over 300 flying hours were logged by each participant. The five test pilots on the evaluation team generally preferred the YA-10, but the aircraft's real advantage over the YA-9 was its 'high' wing, which eased bombing-up operations considerably for ground crews. The YA-10 was also considered to be practically at production status and used an engine already in military service: the TF34 turbofan already in service in the US Navy's S-3 Viking.

The official result of the competition was announced on 18 January 1973. Despite exceeding the requirements of the specification and being generally more agile, the YA-9 had lost – the YA-10's superior survivability and maintainability carried the day. The first order for the YA-

10 was officially approved on 1 March 1973: Fairchild-Republic was given a contract to build ten pre-production YA-10As, powered by the TF34. In an era of intense inflation, funding for four of these were cancelled in July after the USAF had been slow in responding to a request from Congress to evaluate the A-10 against the A-7. This second fly-off competition lasted from 16 April to 10 May 1974 and was convincingly won by the A-10. The designed-for-the-job A-10 had better combat survival, armament and on-station time over the adapted A-7DER proposal.

On 15 April 1975 the first prototype headed for storage after a three-year career in which it logged nearly 600 hours. From February 1975 the two prototypes had been joined in the flight test programme by the pre-production YA-10As. Yet more improvements to the design were incorporated: leading-edge slats were added along with trailing-edge fairings to prevent engine stall when the

wing stalled, the wingspan was increased and the flaps altered. The tail unit came in for a reshape, and air-to-air refuelling capability added.

One of the six YA-10As was lost on 8 June 1978 following a double engine flame-out while testing the gun system. The pilot ejected safely. The testing schedule suffered by reason of it being four aircraft 'light', with the result that the first production aircraft, 75-0258, joined the programme after its first flight on 10 October 1975 – delivery to the USAF came on 5 November. The next three production aircraft also joined the programme, resulting in the aircraft's actual service entry being delayed until March 1976.

Perhaps the most impressive item of weaponry carried by the A-10 is its GAU-8 Avenger 30-mm cannon, capable of firing at a rate of 2,100 rounds per minute. This Gatling-type gun forms the centrepiece of the A/A49E-6 gun system: this carries over 1,100 rounds and weighs nearly two tons.

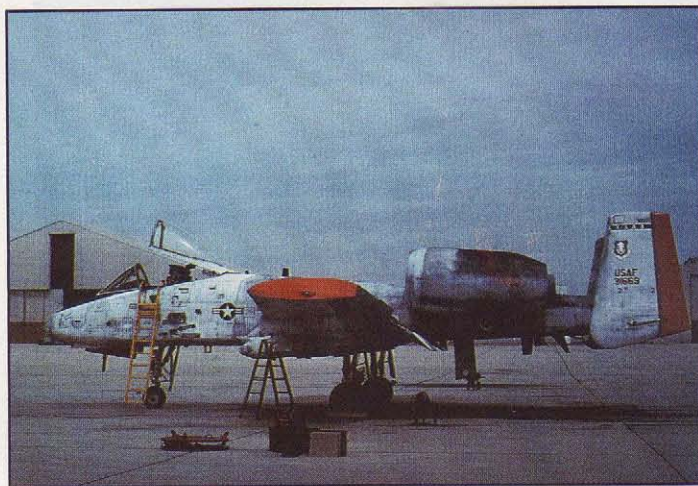


A-10A 8/TFW seen here at Brize Norton, by Sue Bushell



81-0990/AR Grey Fairchild A-10A Nose Art, Mildenhall 25.5.91

The first unit to receive the A-10A was the 355th Tactical Fighter Wing at Davis-Monthan AFB, Arizona which disposed of its A-7s to take on the new machine. The 355th was primarily responsible for training crews for the new aircraft and eventually was redesignated as a Tactical Training Wing to reflect this position. September 1976 saw the A-10 make its debut across the pond at the SBAC show at Farnborough before touring mainland Europe. Arctic tests and participation in exercises also came at this time.



YA-10B

The only two-seater A-10 was the first pre-production YA-10A, which was modified in 1978 in an attempt to produce a night/adverse weather aircraft. However, the USAF was not interested in a night-attack version of the A-10, and also had no need for a two-seat training version as the Cessna T-37 trainer possessed remarkably similar flying characteristics. Fairchild, which had invested some \$2 million of its own money in this variant, then tried to market the A-10B as a missile-carrying maritime strike aircraft, but again this came to naught and the YA-10B ended up in the Edwards AFB museum collection.

Into Europe

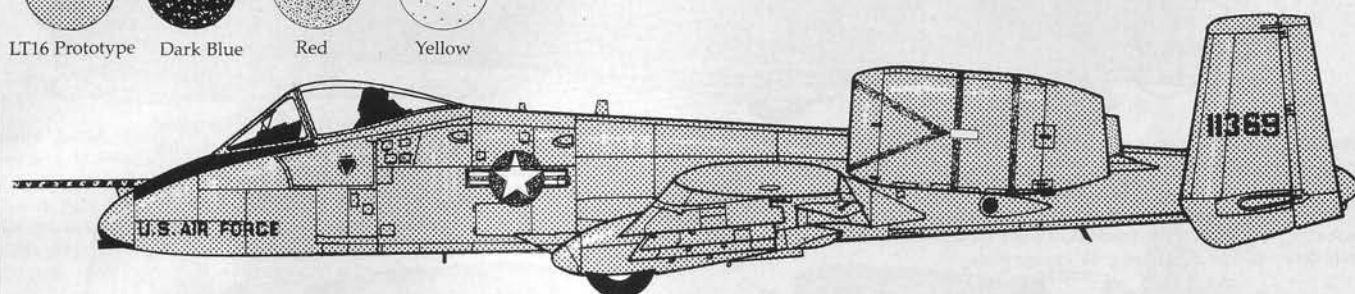
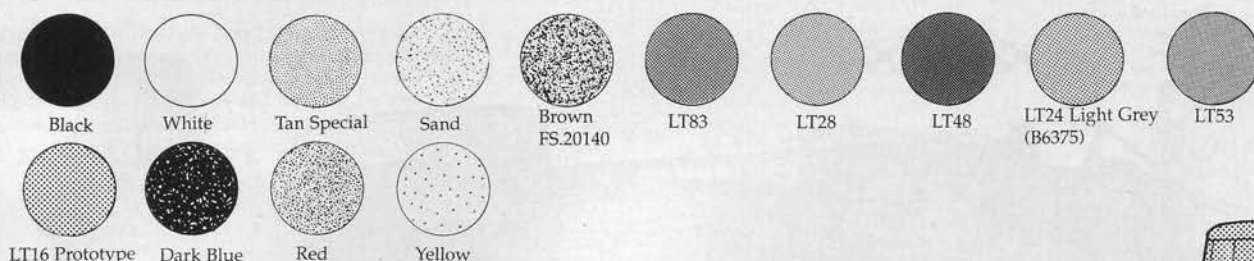
Designed for the jungles of Vietnam, it was inevitable with the cessation of hostilities there that the A-10 would find a home in the area the Americans saw as the most likely threat to world peace, Europe. The first aircraft were delivered to the 81st Tactical Fighter Wing during January 1979, and eventually the wing was to operate six squadrons of A-10s from its twin-base complex at Bentwaters and Woodbridge on the Suffolk coast. The 81st also had call on half-a-dozen Forward Operating Locations dotted around Germany: four of these – Ahlhorn, Leipheim, Norvenich and Sembach – were permanently active with the other two (Jever and Weisbaden) on stand-by in case of emergency. The squadrons were allocated on a rota to specific bases and kept eight aircraft in Germany: 32 A-10s were thus resident on mainland Europe at any time. Defence cuts in 1988 saw this reduce to 24 when the 81st lost two squadrons with the other 8 being provided by the 10th TFW at Alconbury.

These were not the only A-10s to be seen in Europe, however, as the aircraft flourished with various Air National Guard and Air Force Reserve units and these visited Europe on deployment regularly over the next ten years.

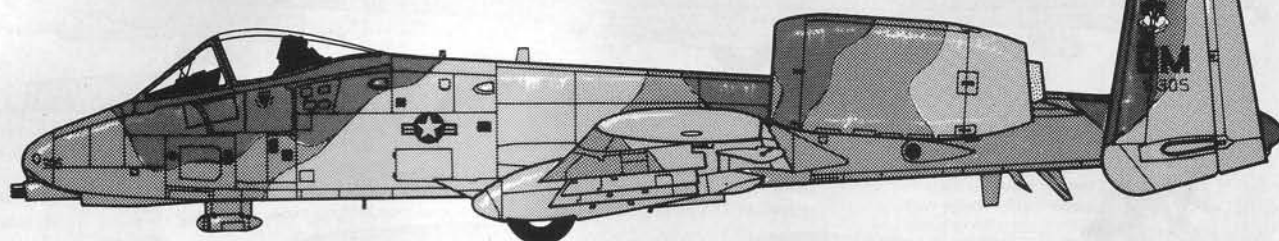
The first ANG unit to receive the A-10 had been the Connecticut Air National Guard, which received its aircraft in April 1979 as part of the USAF's effort to 'modernise' its second-line forces. The first AFRes unit, 917th TFW at Barksdale AFB, Louisiana, received its first machine that June, while front-line units in the Pacific theatre

Pictures, from top to bottom Well-worn 73-1669, seen here in the colours of the AFFTC was the sixth pre-production YA-10A. Following completion of the trials programme it was retained for further testing. (MAP). 79-0218/WRy Fairchild A-10A 92TFS 81 TFW, Fairford 22.7.91. The only two-seat Warthog was the YA-10B prototype: 73-1664. After completion of the trials programme the aircraft was retired. (Fairchild-Republic)

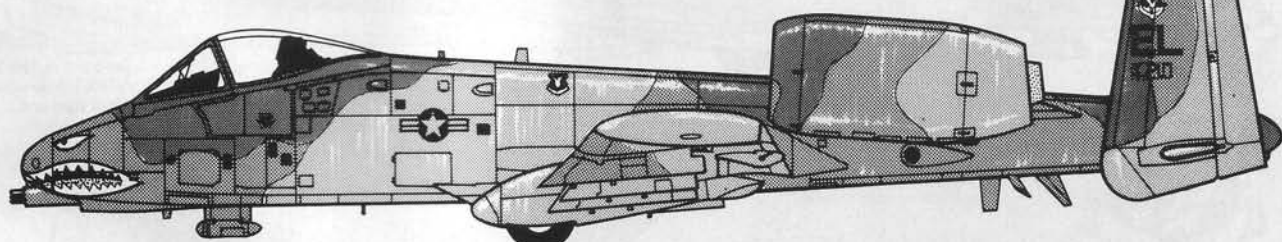
Three A-10A Thunderbolt IIs of the 103rd Tactical Fighter Group, Connecticut Air National Guard at Bradley Field in flight over the state. The 103rd was the first ANG unit to convert to the A-10A. (Fairchild-Republic)



Fairchild YA-10 11369. Colour scheme is overall light grey (aircraft grey - FS.36473). Markings: all lettering black. Warning triangles and striping on engine pods red. Black USAF markings on starboard (upper) and port (lower) sides of wings. Anti-glare panel in black. National markings in four positions, and are red/white/blue. Pitot boom in light grey with red striping.



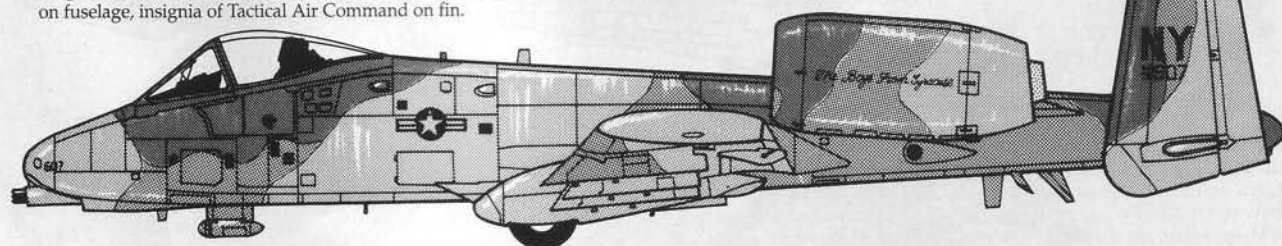
Fairchild A-10A, 75-0305 of 358th TFS, Davis-Monthan AFB, Arizona. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings and lettering are toned down. TAC insignia on fin. Fin insignia is white winged cat's head on green stripe (see above right).



Fairchild A-10A, 79-0210 of 74th TFS, 23rd TFW, England AFB, Alexandria, Louisiana. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings and lettering are toned down. Sharkmouth is black/red/white. Fin stripe mid-blue with white lightning bolt and 74th TFS in mid-blue superimposed. Insignia of 23rd Wing on fuselage, insignia of Tactical Air Command on fin.

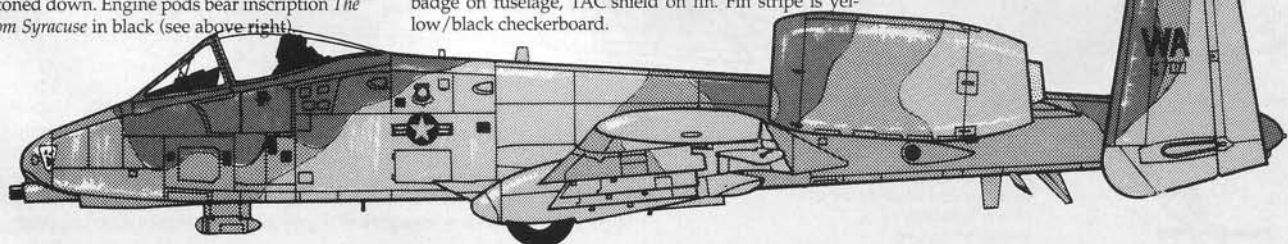
The Boys From Syracuse
The Boys from Syracuse

Variations of inscription on A-10A, 78-0607. Lower version applied when aircraft carried Bavaria markings.



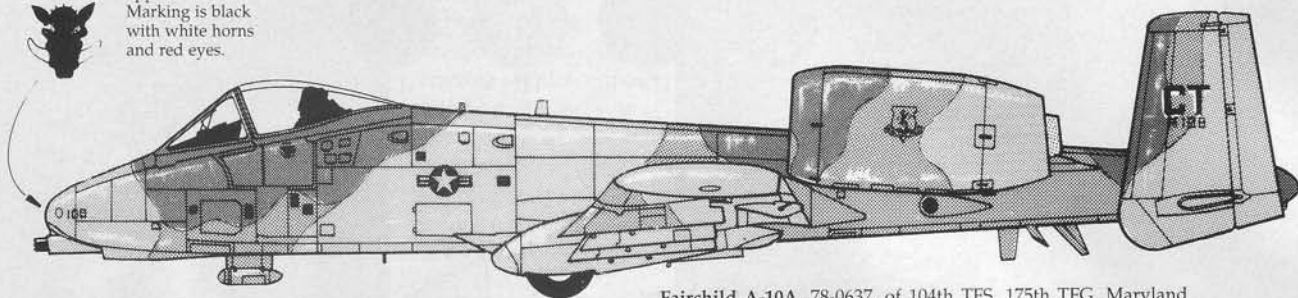
Fairchild A-10A, 78-0607 of 138th TFS, 174th TFW (ANG), Hancock Field, Syracuse, NY. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings and lettering are toned down. Engine pods bear inscription *The Boys From Syracuse* in black (see above right).

Fairchild A-10A, 78-700, 57th TTW, 66th FWS, Nellis AFB. Overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings and lettering toned down. 66th FWS badge on nose. 57th TTW badge on fuselage, TAC shield on fin. Fin stripe is yellow/black checkerboard.



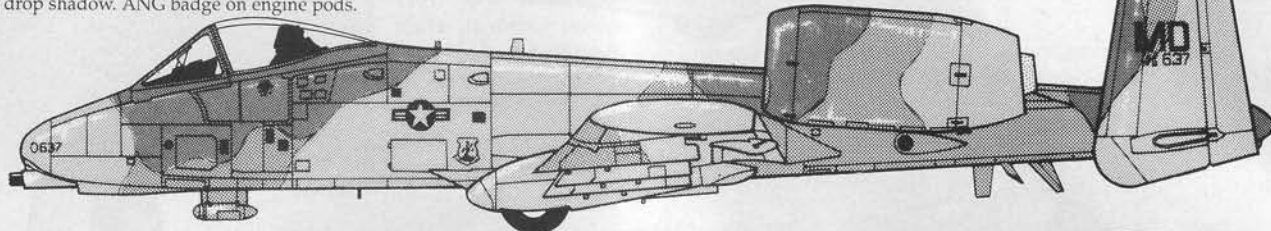


Hogs head marking applied to nose. Marking is black with white horns and red eyes.



Fairchild A-10A, 79-0108 of 103rd TFG, 118th TFS, Connecticut ANG, Bradley Field, Conn. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings and lettering are toned down. CT code is black and white drop shadow. ANG badge on engine pods.

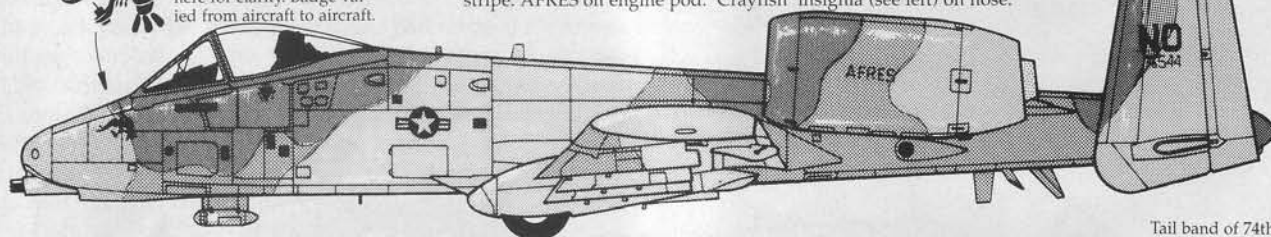
Fairchild A-10A, 78-0637, of 104th TFS, 175th TFG, Maryland ANG. Colour scheme: Overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: all markings are black. ANG badge above fuselage strake.



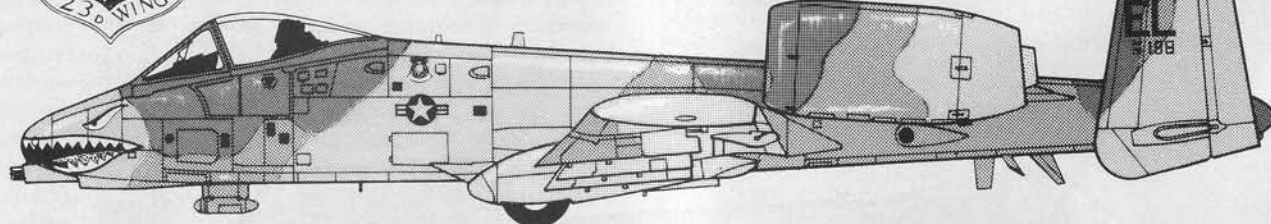
'Crayfish' insignia carried by 706th TFS aircraft. Crayfish is orange-brown with lightning bolt in white and tank silhouette in black. Crayfish shown as black here for clarity. Badge varied from aircraft to aircraft.



Fairchild A-10A 76-544 of 706th TFS, 926th TFG, AFRes, Taif AFB, Operation Desert Storm, Saudi Arabia, February 1991. Colour scheme: Overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings are toned down. Tail band is red with white lower base stripe. AFRES on engine pod. 'Crayfish' insignia (see left) on nose.

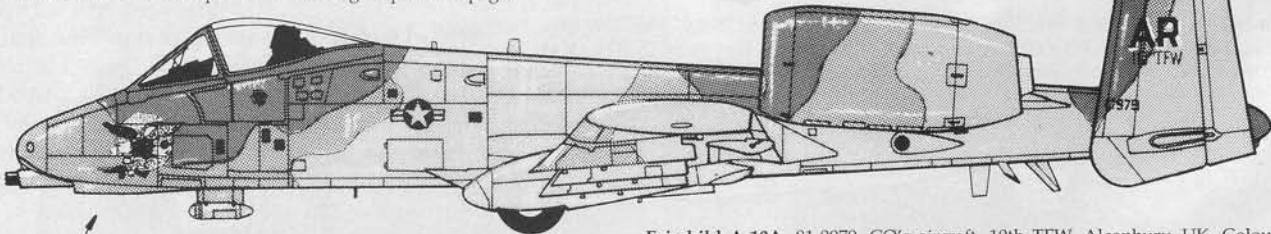


23rd Wing badge. Colours: dark blue shield. White sash with black lettering. Yellow lightning bolt. Tiger is orange black and white, with white wings. Yellow edge to sash.



Tail band of 74th TFS A-10A is blue with seven stars and '74th' in white.

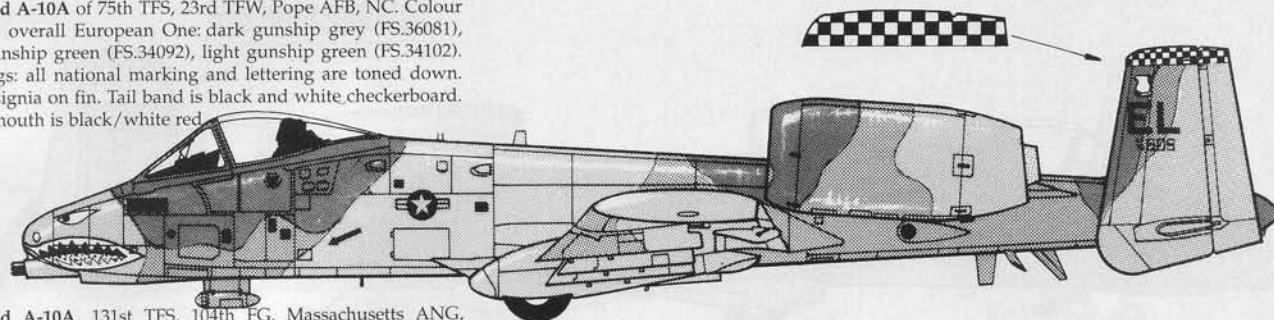
Fairchild A-10A of 74th TFS, 23rd TFW, England AFB, Alexandria, Louisiana. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: all markings and national markings are toned down. TAC insignia on fin. Fin stripe (see above right). 23rd FW badge on fuselage (see above). Sharksmouth markings in black/white/red (compare with marking on previous page).



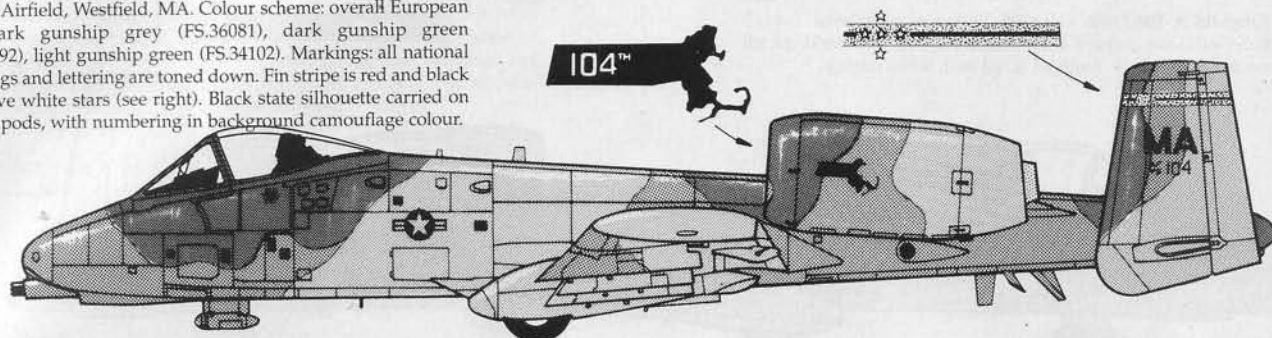
Artwork on nose of CO's aircraft above. Colours: light blue disc. Eagle dark brown/light brown/yellow/white. Gun dark brown and grey.

Fairchild A-10A, 81-0979, CO's aircraft, 10th TFW, Alconbury, UK. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: national markings and letter are toned down. Tail codes read AR with 10th TFW below and are black with white drop shadow. Aircraft serial appears lower on the leading edge of fin. Tail band is white stripe with grey and black stripes superimposed.

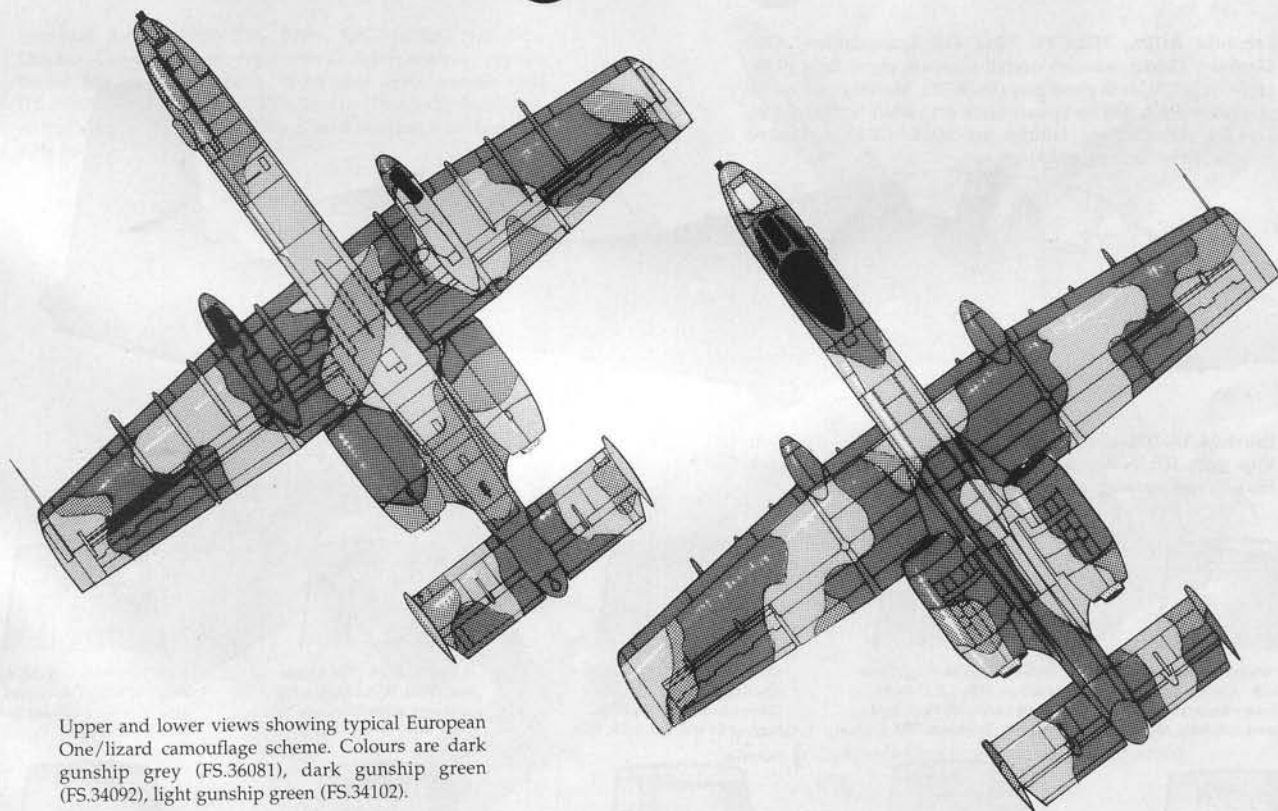
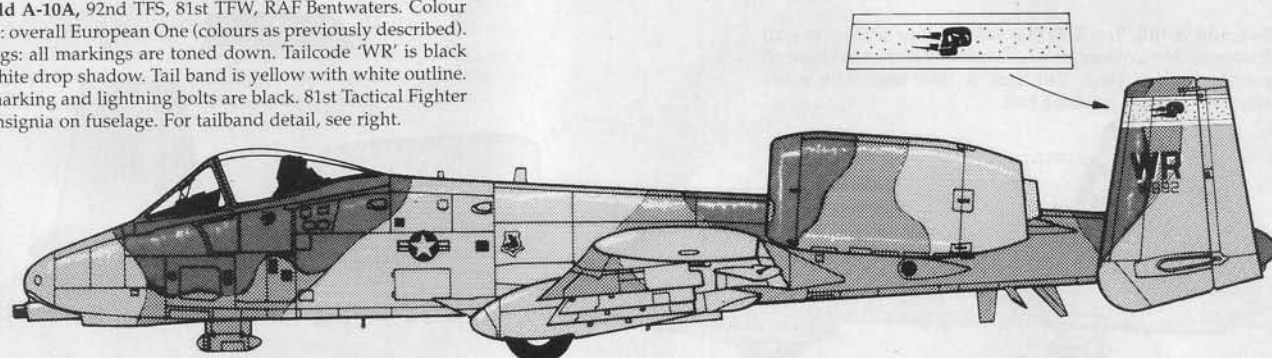
Fairchild A-10A of 75th TFS, 23rd TFW, Pope AFB, NC. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: all national marking and lettering are toned down. TAC insignia on fin. Tail band is black and white checkerboard. Sharkmouth is black/white red.



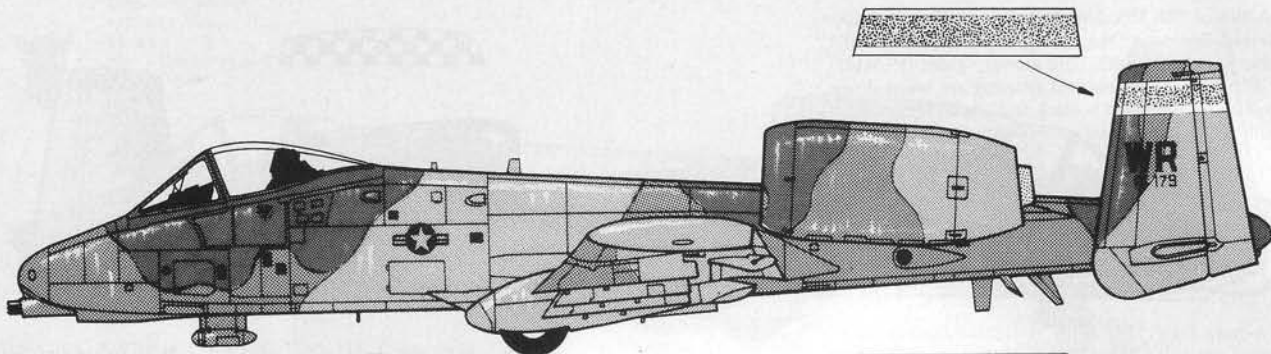
Fairchild A-10A, 131st TFS, 104th FG, Massachusetts ANG, Barnes Airfield, Westfield, MA. Colour scheme: overall European One: dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102). Markings: all national markings and lettering are toned down. Fin stripe is red and black with five white stars (see right). Black state silhouette carried on engine pods, with numbering in background camouflage colour.



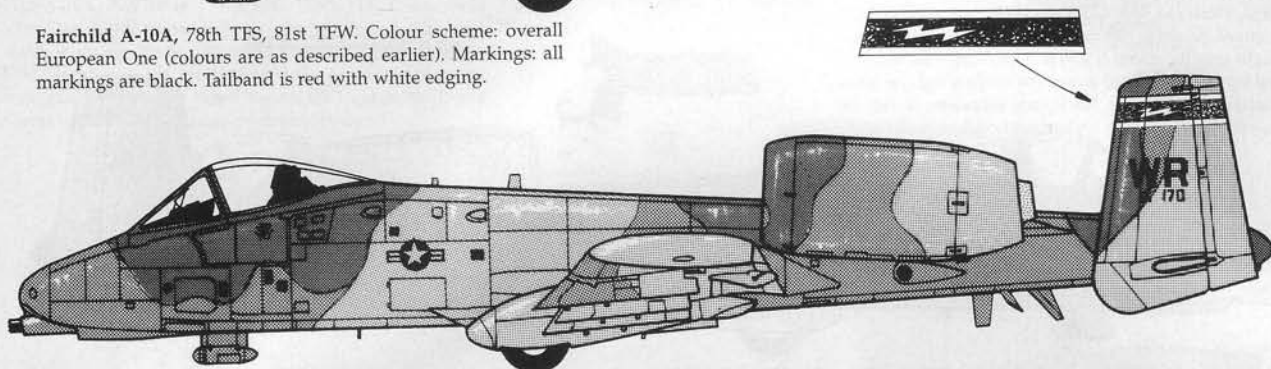
Fairchild A-10A, 92nd TFS, 81st TFW, RAF Bentwaters. Colour scheme: overall European One (colours as previously described). Markings: all markings are toned down. Tailcode 'WR' is black with white drop shadow. Tail band is yellow with white outline. Skull marking and lightning bolts are black. 81st Tactical Fighter Wing insignia on fuselage. For tailband detail, see right.



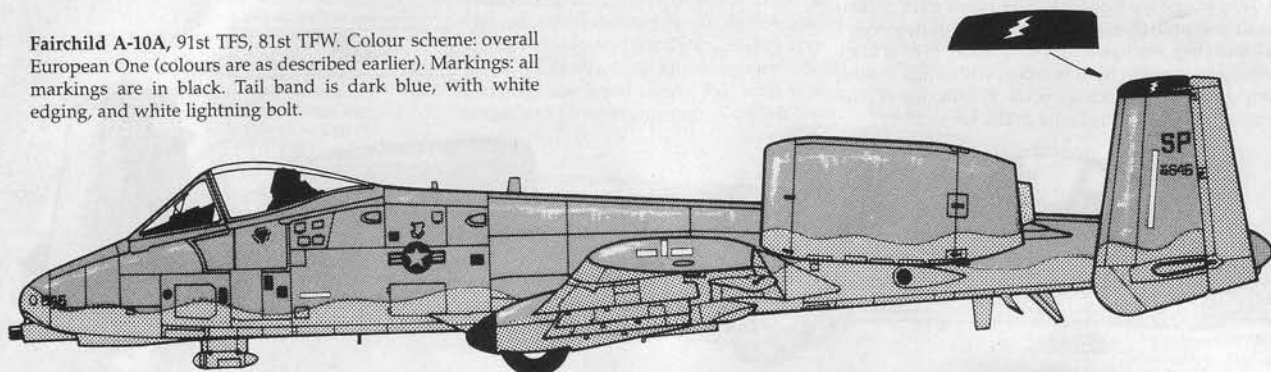
Upper and lower views showing typical European One/lizard camouflage scheme. Colours are dark gunship grey (FS.36081), dark gunship green (FS.34092), light gunship green (FS.34102).



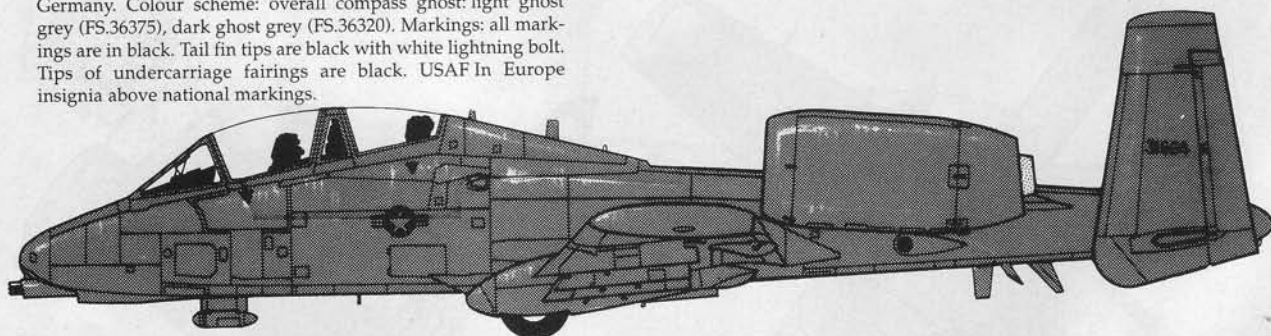
Fairchild A-10A, 78th TFS, 81st TFW. Colour scheme: overall European One (colours are as described earlier). Markings: all markings are black. Tailband is red with white edging.



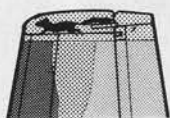
Fairchild A-10A, 91st TFS, 81st TFW. Colour scheme: overall European One (colours are as described earlier). Markings: all markings are in black. Tail band is dark blue, with white edging, and white lightning bolt.



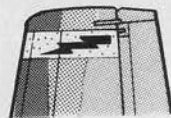
Fairchild A-10A, 510th FS, 52nd FW, Spangdahlem AFB, Germany. Colour scheme: overall compass ghost: light ghost grey (FS.36375), dark ghost grey (FS.36320). Markings: all markings are in black. Tail fin tips are black with white lightning bolt. Tips of undercarriage fairings are black. USAF In Europe insignia above national markings.



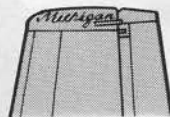
Fairchild YA-10B, s/n 31664. Colour scheme: overall dark gunship grey (FS.36081). Markings: all markings are in black. Ejection seat warning triangles are in red.



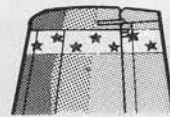
18th TFS, 343rd Composite Wing, Eielson AFB, Alaska. Colours: mid-blue band with dark blue fox superimposed. Tail codes: AK.



358th TFS, 355th Wing, Davis-Monthan AFB, AZ. Colours: yellow band with black lightning bolt. Tail codes: DM.



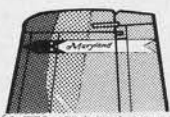
172nd TFS, 110th TFG, Michigan ANG. Colours: (on Compass Ghost scheme); 'Michigan' in black script text. Tail codes: BC.



355th TFS, 354th TFW, Myrtle Beach AFB, SC. Colours: white band with seven blue stars. Tail codes: MB.



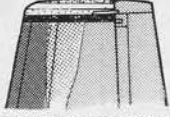
353rd TFS, 354th TFW, Myrtle Beach AFB, SC. Colours: red band with black running panther. Tail codes: MB.



104th TFS, 175th TFG, Maryland ANG, Baltimore, Maryland. Colours: white and green arrowed band, with five white stars and 'Maryland' in black text. Tail codes: MD.



103rd TASS, 111th FG, Pennsylvania ANG. Colours: red band with 'Pennsylvania' in white gothic script. Additional illustration shows 'Keystone' motif applied to engine pods, in red.



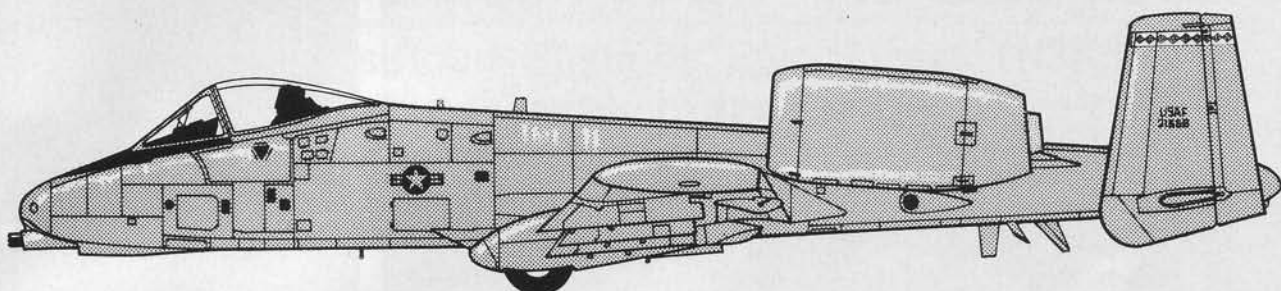
354th TFW (Commanders aircraft), Myrtle Beach AFB, SC. Colours: four bands from top to bottom: red/green/yellow/mid-blue. Tail bands: MB.



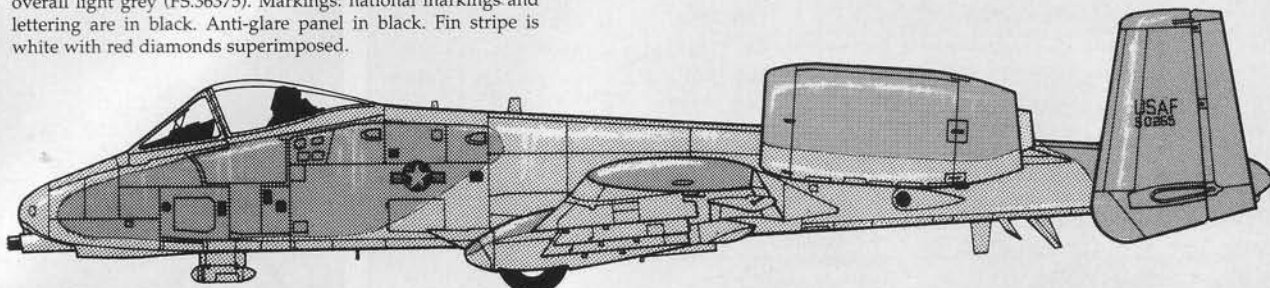
23rd TASS, 602nd Tactical Air Control Wing, Davis-Monthan AFB, AZ. Colours: dark blue fin cap band, with three yellow stars. Tail codes: NF.



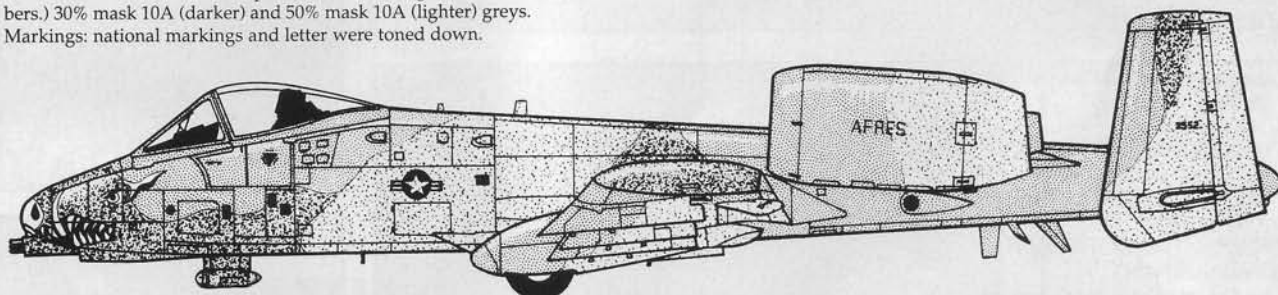
21st TFS, 363rd Fighter Wing, Shaw AFB, SC. Colours: black band, with thin white pinstripe base, and red lightning bolt. Tail codes: SW.



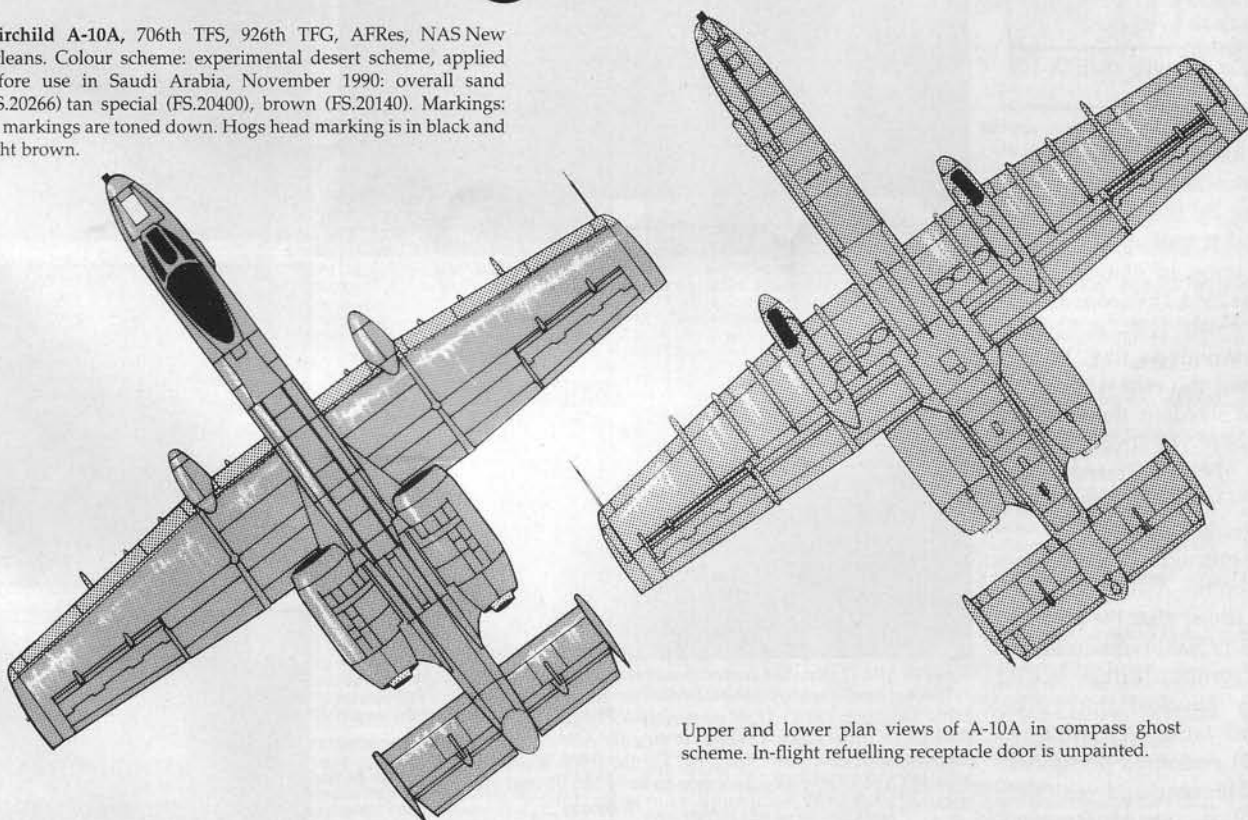
Fairchild A-10A, fifth production aircraft, s/n 73-1668, Air Force Flight Test Center, Edwards AFB, California. Colour scheme: overall light grey (FS.36375). Markings: national markings and lettering are in black. Anti-glare panel in black. Fin stripe is white with red diamonds superimposed.



Fairchild A-10A, 50265, USAF. Colour scheme: intermediate mask 10A scheme. (Mask 10A paints were not assigned FS numbers.) 30% mask 10A (darker) and 50% mask 10A (lighter) greys. Markings: national markings and letter were toned down.



Fairchild A-10A, 706th TFS, 926th TFG, AFRES, NAS New Orleans. Colour scheme: experimental desert scheme, applied before use in Saudi Arabia, November 1990: overall sand (FS.20266) tan special (FS.20400), brown (FS.20140). Markings: all markings are toned down. Hogs head marking is in black and light brown.



Upper and lower plan views of A-10A in compass ghost scheme. In-flight refuelling receptacle door is unpainted.

A-10 operators

Unit	Base	Received A-10	Disposed of A-10
5th TACG	Suwon, RoK	Jan 1984	Oct 1990
10th TFW	Alconbury, UK	Aug 1987	Mar 1992
23rd Wing	England AFB, LA	Sep 1980	current
51st Wing	Osan, RoK	Jan 1982	current
52nd FW	Spangdahlem, Germany	Jan 1993	current
57th Wing	Nellis AFB, NV	Oct 1977	current
81st TFW	Woodbridge/Bentwaters, UK	Jul 1978	Mar 1993
103rd FG	Bradley Field, CT	May 1979	current
104th FG	Barnes A/f, MA	Jul 1979	current
110th FG	WK Kellogg A/p, MI	mid-1991	current
111th FG	Willow Grove, PA	Jun 1990	current
128th FW	Dane County Regional A/p, WI	Jun 1981	Dec 1992
174th TFW	Hancock Field, NY	mid-1979	late-1988
175th FG	Glenn L Martin State A/p, MD	Oct 1980	current
343rd Wing	Eielson AFB, AK	Oct 1981	Aug 1993
354th FW	Myrtle Beach, SC	late 1976	current (now at Eielson)
355th Wing	Davis Monthan AFB, AZ	Mar 1976	current
363rd FW	Shaw AFB, SC	Apr 1992	current
412th Test Wing	Edwards AFB, CA	Oct 1972	current
442nd FW	Richards-Gebaur AFB, MI	Jun 1982	current
507th ACW	Shaw AFB	Oct 1991	Jun 1992
602nd ACW	Davis-Monthan AFB, AZ	Oct 1987	Jun 1992
917th FW	Barksdale AFB, LA	Oct 1980	current
926th FG	New Orleans, LA	Jan 1982	Late 1992
930th OG	Grissom AFB, IN	Jun 1981	current
3246th TW	Eglin AFB, FL	late 1982	1992

A-10 production

71-1369 to 71-1370
73-1664 to 73-1669
75-0258 to 75-0309
76-0512 to 76-0554
77-0177 to 77-0276
78-0582 to 78-0725
79-0082 to 79-0225
80-0140 to 80-0283
81-0939 to 81-0998
82-0646 to 82-0665

and Alaska received their A-10s at the end of 1981.

Desert Shield, Desert Storm

The A-10 was being eyed for retirement by the dawn of the 1990s, and it took a war to get the top brass to change their mind. The 23rd TFW at England and the 354th TFW at Myrtle Beach provided the initial aircraft and the two composite wings involved in the conflict had a total of 144 aircraft based at King Fahd International Airport, Damman when the fighting broke out.

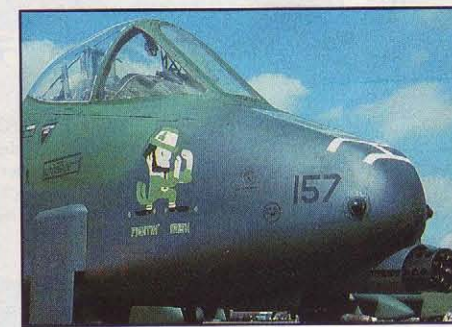
Space precludes a full commentary on the A-10s activities, suffice it to say that the aircraft flew over 19,500 hours on nearly 9,000 sorties, during which time they knocked out 1,106 trucks, 987 tanks, 926 artillery pieces, 501 armoured personnel carriers, 249 command vehicles, 112 military structures, 96 radars, 72 bunkers, 51 Scud launchers, 11 Frog missile launchers, 50 AAA sites, 28



Top. This 81st TFW A-10A is identified as being part of the 91st TFS, by virtue of its blue tail band. The other six squadrons in the Wing carried red (78th TFS), yellow (92nd TFS), grey (509th TFS), purple (510th TFS) and black (511th TFS). (Sue J Bushell) Full circle. Above. Delivered in grey, the A-10s of the 81st TFW were later camouflaged in dark greens and greys. For the 1990s, it was back to grey! (Sue J Bushell) Close up nose art details from top to bottom 81-0967/AR, 81-094/AR, 81-0948/AR, 80-0157/AR, 80-0170/AR, 79-0224/AR

command posts, 10 parked fighters, nine SAM sites, eight fuel tanks – they also scored two

air-to-air helicopter kills. Not bad for an aircraft in the twilight of its career!



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DARK THUNDERBIRD



Jerry Scutts builds Monogram's 1:48th scale A-26C Invader

JOINING the Marauder and Mitchell as a worthy addition to Monogram's fine stable of 1940s attack/medium bombers, the Douglas A/B-26 Invader is equally impressive in this highly workable and increasingly popular scale. Pressed in black plastic, the completed model spans almost 18 inches, is nearly 13 inches long and represents one version, the clear nosed B-26C. This will perhaps be a drawback to some modellers who want to build a solid, full-of-guns nose B version but conversion kits with which to do so are available from specialist firms.

Monogram has in fact tailored its kit specifically to a couple of aircraft flown by the 34th Bomb Squadron, the

'Thunderbirds' of the 17th Bomb Wing in Korea, making conversion back to earlier World War 2 models not as easy as they might have. Only one gun turret is provided along with two underwing gun packs, obliging the modeller who does not have a readily available range of 1:48th scale spares to buy two kits to obtain these 'missing' items, should a typical Ninth Army Air Force

machine with two turrets and four wing package guns be the preferred subject, for example.

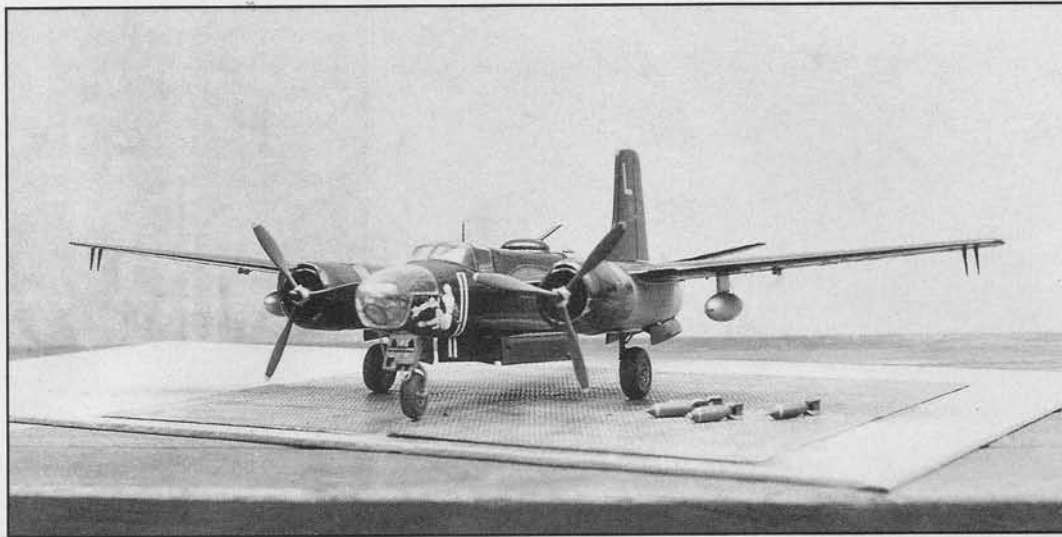
I feel that Monogram has gone for a rather economical kit, even the two chosen colour schemes/decal subjects hardly reflecting the decoration worn by the type even in a combat zone. Both aircraft (B-26C-35 44-35423/L named *Dream Girl* and B-26C-50 44-35684/C *Toni C II*) had an overall black finish

Robert Mikes's famous A-26 named 'Monie' of the 37th BS, 17th BG in Korea and more or less configured as the Monogram kit complete with a Shoran set in place of the top turret. The kit canopy is supplied in one piece. (Author's collection)

with modest green tail and wingtip trim, either machines flying combat with the 17th and other wings in Korea.

An Armée de l'Air A-26C in service with GB I/25 'Tunisie' during the Indo-China war. Some A-26s used against the Viet Minh carried a full complement of turret guns, as the French tended to use the aircraft as they were configured upon delivery from US stocks, without making their own field modifications. (ECPA)





The nose art, individual letter and squadron green trim of 423 have, incidentally, been applied to an Invader preserved by the US Air Force Museum, this machine bearing the serial number 44-35733, just to confuse everyone! The museum aircraft is a B-26C-45 and almost certainly retains its original serial rather than that of the 34th BS subject aircraft and, in a sense, both are correct.

It might be that Monogram has plans to later revise this kit with alternative parts and there is some evidence of that possibility, namely flashed-over wing holes for rocket hardpoints which are not provided in this kit. Conversely, the nose section is moulded integrally with the fuselage which, while avoiding a joint line problem and possibly a poor fit often associated with a separate section, does mean that the modeller will have to resort to the saw if a solid nose is preferred.

As the kit stands, Monogram has produced a replica of an aircraft which has endless conversion possibilities and the advantage of being flown by so many air forces and indeed civilian concerns that it may be completed in appropriate 'local' markings almost anywhere the modeller lives! Also, relatively few of the non-

US Air Forces machines operated with the full original complement of turret guns after World War 2, so the kit's reduction of plastic firepower will not be critical for some of the many alternative colour schemes applicable to the clear-nosed version.

Construction

As usual, Monogram's instruction sheet is well laid out and easy to follow and the Invader has few problem areas in construction, but I would recommend numerous dummy runs to check fit. Kit design follows that of previous mediums in this scale in that the wings are butt-joined to the fuselage with the aid of two strong through fuselage 'spars' incorporating the fore and aft

bomb bay bulkheads to ensure that the correct dihedral angle is obtained.

Building time is reduced by the horizontal tailplanes being supplied as a single item which is merely slotted into the rear fuselage. I'm all for this approach if the result is convincing and I have no complaints in this instance.

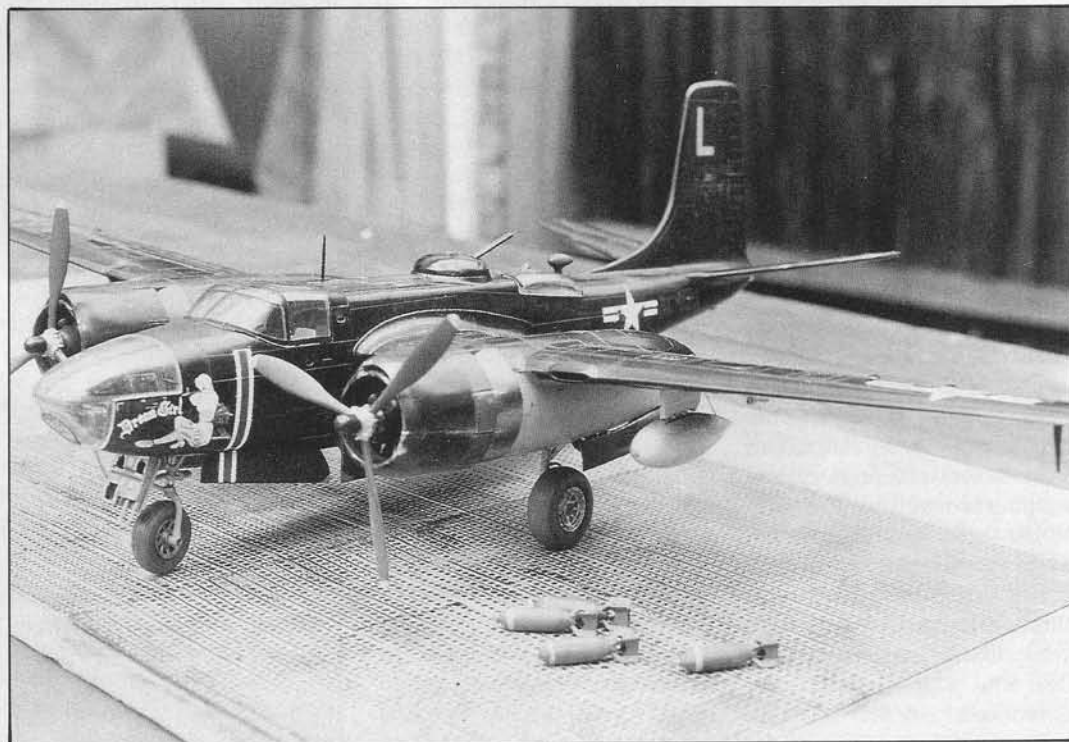
Three-pointing a tricycle undercarriage model with a clear nose can be a challenge and the glass nosed Invader makes the job of internal weighting near impossible! The wimp's way out is to utilise the transparent pogo stick under the rear fuselage although the purist won't want that. What to do?

It occurred to me some while back that it should be

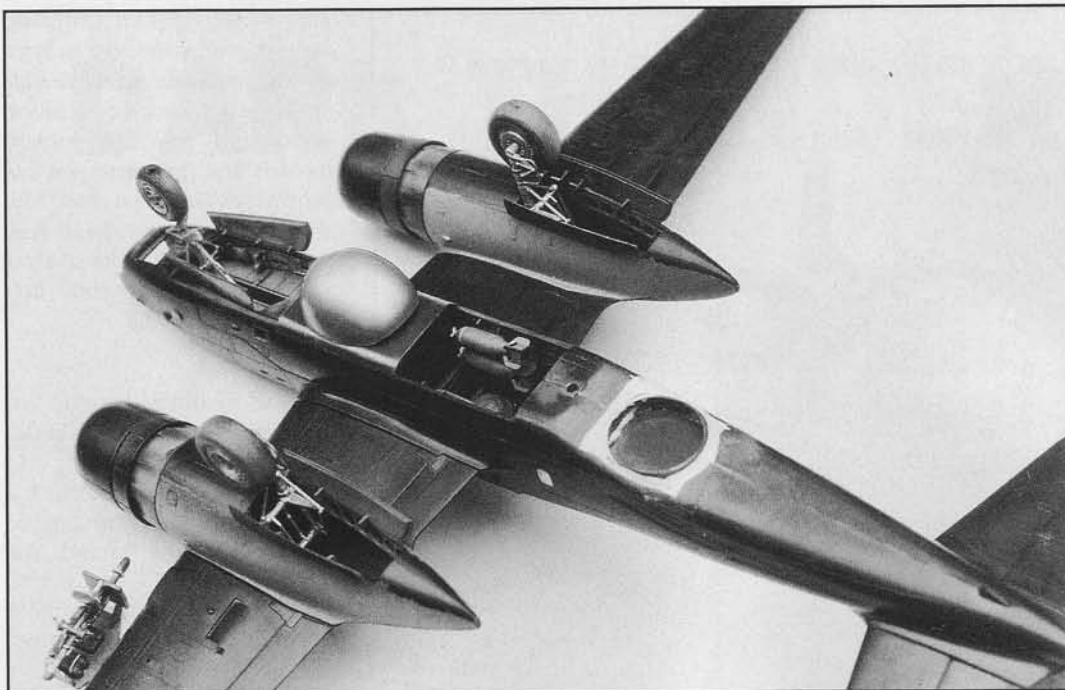
The Monogram kit virtually complete, with underwing racks for two napalm tanks added. A wide range of extra stores may of course be added to models of military Invaders and two conversion kits currently on the market enable both six and eight gun solid nose versions to be built. One of these also provides the original flat-topped cockpit canopy.

possible to almost literally pin a potentially tail-sitting model to a baseboard by drilling into the nosewheel and inserting a hidden pin from the underside of the board up through the tyre. This may be old hat to many display modellers but I finally tried it for the first time on the Invader and – it works a treat. A bonus with this method is that it avoids putting too much stress on the nose-wheel leg (as I did on the Monogram Marauder) by entombing too much internal weight which is next to impossible to remove when the fuselage halves are glued together.

Among the areas that Monogram has detailed nicely on the A-26 are the wheel wells. Rather than simply scribing the walls of the nosewheel and nacelle bays, structural sections are attached to the doors themselves, creating a welcome 'three-dimensional' effect. These sections are sup-



With its nosewheel pinned to a baseboard (replica pierced steel planking is used here), the Monogram Invader has the correct 'sit' of the full size aircraft. Utilising a baseboard avoids the challenge of internally weighting a very cramped nose.



Among the changes that may be made to the A-26s is to fit the H₂X radar and shorten the bomb bay as shown. The radome comes from Monogram's B-29, as does the 'missing' ventral turret, shown in the process of being fitted here.

plied integral with the under-carriage doors and the latter really need separating, because if one follows the instructions and positions the structural members inside the nacelles, the doors hang too low with the hinges showing. In reality the A-26's nacelle doors hung flush without the hinges being visible and with them cut off the modeller can position the doors later to obtain the correct 'hang'.

Criticism can also be levelled at the design of the main landing gear legs, which are 'scale flimsy' and have locating pins that are a little vague and not overly strong. The instructions advise that these be positioned before the nacelle halves are glued but I preferred to manoeuvre them into position after the nacelles are attached to the wing. This avoids the horror of an off-centre pair of oleos. As in common with many aircraft, the Invader's main gear legs were straight when viewed from head-on.

All three crew positions feature liberally scribed sidewalls and the flight deck probably has enough raised detail to suit most tastes, although careful painting is required. There are no decals for instruments, the convincing rendering of all these being down to the modeller's steady hand. All transparencies are big and very clear and will show up any skimping of interior finish, so be warned...

Internal detail can, of course, be added. The kit's cockpit floor has part of the heater trunking moulded in but photographs do show that this also ran around the left side of the cockpit at elbow height and across the top of the instrument panel. Suitably 'ribbed' plastic tubing can be used to replicate this feature and the modeller can also position the throttle levers and so on to the limits of scale and eyesight.

The chunky nose hatch of the A-26C was often left in the 'down' position when the aircraft was on the ground and this item can easily be cut out and detailed. I also opened up the locating holes in the wing underside to take the wingtip airdials and the stores racks provided.

Regarding the open hatch, modellers should be advised, however, to check out the Tech-Air conversion set first for not only do these (two are available) provide a solid nose but also two underwing bomb racks, a new canopy – and the hatch. Needless to say, I'd cut mine out of the kit before obtaining the detail set... still, you have to make the strut that holds it down, so the exercise was not entirely wasted!

If the modeller does choose to build the Invader 'straight from the box' and complete the kit in one of the suggested markings choices, he has plenty of printed references, particularly to the nose art. A

new book on this subject seems to appear each week these days and some recent titles have included some excellent Korean War Invader shots. The noses of both aircraft selected by Monogram for their decals have been pictured a number of times, as the accompanying literature list indicates.

Published photographs showing all of the subject aircraft are not so easy to find – but one view of 684 that has appeared in a specialist publication clearly shows that this particular aircraft was fitted with the Shoran top turret housing by the spring of 1953.

As with any kit, the keen modeller can add items to enhance the overall finish of the Monogram Invader. These include extra underwing racks and a greater variety of ordnance than the bombs provided, Korean Invaders invariably carrying napalm, photo-flash bombs and rockets as well as package guns and in a short-lived, highly hairy experiment, a Navy searchlight to spot trucks and trains blacked out at night. This latter, as well as the ventral radar widely used by Korean Invaders, was shown to advantage in an excellent *Scale Aircraft Modelling* article in the May 1992 issue.

When painting the starboard side of the nose, don't forget to indicate the curved plate that jutted forward into the transparent panel on that side. This was a carry-over

from World War 2 when all A-26Cs had provision for two .50 inch machine guns positioned below the bombardier's section. Most, if not all, Korean B-26s featured this panel, although the troughs for the twin .50 inch machine guns were more often than not, plated over.

References will also show many Korean Invaders with the taller top turret cover over the Shoran set. This sat eight inches higher than the turret ring on the full size aircraft and will need a circle of plastic card to raise that on the kit. I'll be the first to admit that this latter feature does not look as attractive as an armed gun turret – but there we are!

Painting

Offering the 'baseline' choice of three overall colour schemes – black, natural metal or camouflage – A-26Cs sported a wide array of complementary colour trim on engine cowlings, wingtips and vertical tail surfaces, so variations should present few problems. The specialist decal concerns, including AeroMaster have a number of excellent sheets available. One or two camouflaged A-26Cs may have reached the 3rd Bomb Group in the Pacific, this unit being as far as I know the only one to fly OD and grey aircraft during and after World War 2. Some solid-nosed examples were operated in Korea by this group. Apart from the camouflaged prototypes and black-finished 47th BG machines based in Italy, all other wartime Invaders had NMF, none in camouflage being despatched to Europe for the Ninth Air Force, as far as the writer is aware.

In Korea the black paintwork appeared to stand up fairly well to the rigours of combat, which nevertheless induced the usual grime and oil stains; A-26 engine nacelles soon became very stained by



Another view of the underside of the model, with the dorsal turret in place. The retractable crew-entry step is not supplied with the kit, nor are the numerous external airdrops that can be added for a fully-detailed model. Wing guns may also be added if the individual aircraft being modelled was so armed.

exhaust emissions, to the extent that on some aircraft they actually looked as though they were painted off-white or light grey. As with many aircraft, the exhaust staining on Invaders followed a pattern and models depicting operational machines should ideally have this feature reproduced as closely as possible.

Other conflicts involved Invaders and the most extensive modification to the Monogram kit would be to create a B-26K as operated by the USAF's 603rd and 609th Special Operations Squadrons for, respectively, training and operations over Vietnam. Changes to the kit would include adding a solid eight gun nose and wingtip fuel tanks, fitting new, squared-off 'paddle blade' propellers,

removing all trace of the top turret ring and beefing-up the underwing stores stations to ten. In addition, modern communications required a blade antennae, a couple of the mast-type and a 'horseshoe' aerial under the aft fuselage.

More conventionally-armed Invaders were extensively used by the Armée de l'Air in Indo-China and Algeria, France being the largest foreign user of the type. Again, the usual wide variations in configuration applied and the French made a number of additional modifications of their own, including the fitting of the AI Mk.X radar removed from Meteor NF.11s under a night fighter programme – which is a bit different!

South American and other non US Air Forces operated a

substantial number of B-26s and many aircraft had typically bright marking trim applied. Many of these schemes are to be found in Dan Hagedorn's book *Foreign Invaders* from Midland Counties Publications. Some 25 countries plus the US are known to have operated the B-26 at various times between the 1950s and 1980s.

Among the most striking markings ever applied to a B-26 – or any combat aircraft come to that – was the overall 'shark' scheme of Sakdron 1, Indonesian Air Force. Taking the long association of combat aircraft with that marauder of the seas to its ultimate, the Indonesians applied the shark fin and body to the B-26's fuselage and tail as well as the mouth to the nose. As with many of the more elaborate Invader colour schemes, though, this was based on a solid-nosed B model.

To round off this review, the Monogram A-26C ostensibly offers the modeller a whole world of challenging colour schemes and configuration changes but at the price of purchasing extra parts as conversion kits or undertaking some scratchbuilding if the B-26B is wanted. There are numerous variations on the glass-nosed version provided by Monogram, however most of the larger size military users operating both bombardier and attack versions.

That the effort of research-

ing alternative schemes will be rewarding is hopefully reflected here, for the A/B-26 saw action in four major wars and numerous minor conflicts and was – in its day – a superb combat aircraft. The Invader also gained considerable notoriety by occasionally reaching the hands of nationalist pilots flying for dubious regimes by highly devious if not exactly illegal means, giving it an aura of mystery that more mundane types can never claim.

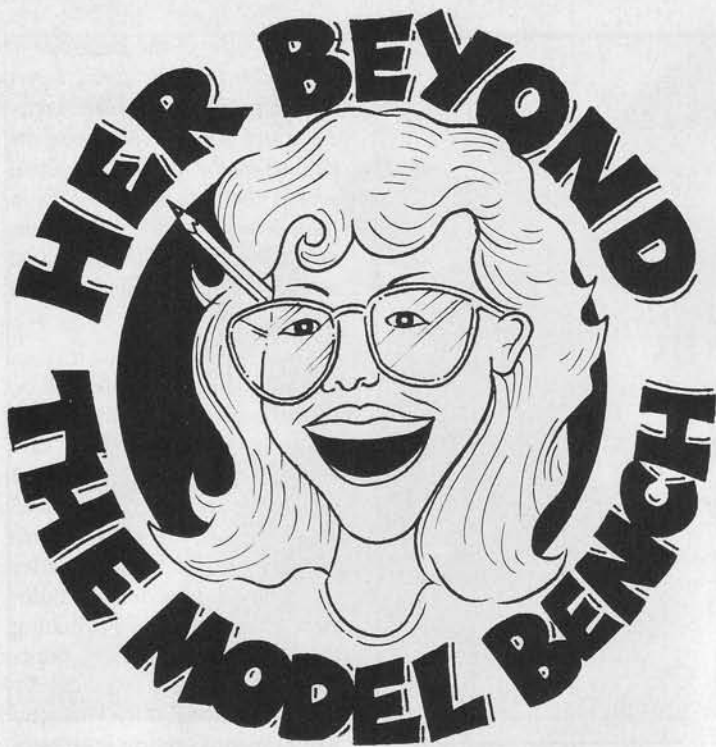
For the modern-day plastic modeller there are enough Invaders left in museums and on the air show circuit in flying trim for many airframe details to be photographed in close-up to enhance the model, with the rider that one should always check any changes made to 'modern' examples compared to the originals. This is particularly true of the navigational equipment, which invariably requires external antennae different to that of World War 2 or Korean service.

At nearly £25.00 the Monogram A-26C is not the cheapest of kits and a pair of them will lighten the modeller's wallet considerably. But if piston-engined aircraft in this scale are your thing, this kit will be hard to resist as its possibilities are almost limitless, particularly if one of the more challenging conversions is attempted. A few have been outlined above but what about a Navy JD-1 with a full brace of Ryan Firebee drones – see you at the IPMS Nationals in 2015?

The following list of Invader references is far from exhaustive but will provide many alternative colour schemes and configurations. All are good but the Ian Allan 'at War' contains some caption errors in the A-26 chapters, including one photograph of a 3rd BG machine that has the aircraft labelled as an A-20!

USEFUL REFERENCES

A-26 Invader in Action (Aircraft Nos.37 and 134), (Mesko); *Planes, Names & Dames Vol.2 1946-60* (contains colour and black and white photos of Monogram kit subject aircraft review model courtesy Revell (GB) Ltd), (Davis); *Air War Over Korea* (Davis); *Bent & Battered Wings Vol.2 USAAF/USAF Damaged Aircraft 1935-57* (Davis), all from Squadron/Signal; *Air War Over Korea – (Koku-Fan Illustrated No.27)*; *Koku-Fan Famous Airplanes of the World No.92* (12-1977); *Classy Chassy* (Logan and Nield) Mathews Miller Dunbar; *Korea The Air War (2)* (Thompson) Osprey; *A-20 Boston at War* (Hess) Ian Allan; *Air War over Korea* (Scutts) Arms and Armour Press; *The History of Aircraft Nose Art* (contains colour and black and white photos of Monogram kit subject aircraft) (Ethell) Motorbooks International; *L'Armée de l'Air en Indochine; Transport et Bombardement 1945-54* (Sup Air Publications); *Foreign Invaders* (Hagedorn) Midland Counties Publications; *Central American and Caribbean Air Forces* (Hagedorn) Air-Britain; *The US Air National Guard* (Francillon) Aerospace Publishing; *The Douglas Invader Story* by Rene Francillon (Air Enthusiast Seven); *B-26 Invader in Korea* by John Horne – *Scale Aircraft Modelling Vol.14*, No.8 May 1992; *Warpaint scale plan* – *Aviation News Vol.6* No.21.



Hello, here I am again, back by popular demand. Oh, you demanded to see the back of me, well it was close. This month I thought we would discuss Laundry. 'What has this to do with modelling?' I hear you cry – all shall soon become apparent. Lady modellers will probably not be guilty, first because most women are vaguely clothes conscious and, secondly, because they are female and therefore, by definition, less guilty in every way, but I think you men may well be fidgeting uncomfortably by the end of this.

Modelling is an inherently messy business, which is fine, I'm not house proud, I don't care if his model room floor is invisible beneath a pile of resin powder he has sanded from his latest creation, aside from anything else he goes a peculiar colour at the mere thought of my brandishing a Hoover within 30 ft of his display case. No, what upsets me is his clothing; as with the true artist when the muse is upon him nothing can come between my Dearly and his workbench including the 20 seconds it would take to put on an overall. The result is that almost all his trousers now sport a very interesting collection of permanent stains in the lap region. This leaves his spouse in a difficult dilemma; do I leave people to draw their own conclusions about his appearance, or do I spend my life explaining, risking drawing

more attention to the situation than it would otherwise demand? As modelmakers I don't suppose you need to be told how these marks are created, but just in case you do they are the inevitable result of trying to hold numerous fiddly little bits of model and apply paints and glues to specified areas of them. Things get dropped. The Dearly regards catching them in his lap not only as inevitable, but as desirable since if they hit the carpet he might never find them again. I would have more sympathy if he pretended he did it to protect the carpet from any unsolicited additions to the pattern, but he doesn't even think to lie. I am expected to understand that this particular 1mm long piece of plastic is vital and even though he may have dozens which look very like it they just won't do the job.

Two of the more notable occasions when even he admits that wearing overalls or at least old clothes might have been advisable went something like this. Having gotten fed up with his pairs of camouflage trousers – none of which had started life as camouflage trousers I might add – I succeeded in forcing him into buying clothes. Among these were some splendid jeans which were in a sale – vitally important that, as getting the Dearly into any shop that doesn't supply models or reference material about the planes he makes is never very

easy, then actually getting him to part with money for something that will not be of service in his hobby is even more difficult, £30 on a model is an investment, £30 on trousers is a criminal waste. Still, less of my whingeing, back to the table. I may be mistaken – I doubt it but it is just possible – but I think it was actually the first time he had worn them, we arrived home from some outing and he disappeared. I'm not an unreasonable woman (NB. This is not the title for an essay and I am not asking you to debate this point) so I didn't immediately demand to know what he was doing – I mean everyone is entitled to some time to themselves. I shall know better next time. I was alerted by a howl of horror and rushed into his model room, to find Dearly trying to mop red yuck off of these new trousers. My immediate thought was that the accident I had seen coming had finally arrived, he is forever etching interesting designs into his thumb with one or other of his knives, I keep a constant supply of plaster cut into thumb size pieces as a result. Had he been quicker he might have made use of how it looked; fortunately unfailing honesty is one of his traits (especially with regard to questions like 'Do these shoes make my feet look big?' and 'Do I look too huge in these trousers?'). It rapidly became apparent that I wasn't about to

be required to sew a severed leg back on; it was a pot, a whole pot, full of red enamel paint, which had been emptied inartistically down his new trousers. They hang to this day in my wardrobe, not worn because he would forever be explaining that 'No Officer, I am not leaving the scene of some ghastly crime' but not thrown away because they're such a useful piece of evidence when we are having one of our little discussions about such matters.

The other occasion was when he superglued his jumper to his trousers, far less dramatic but just thinking about him being unable to straighten up when he rose from his chair as a result of this slip still makes me chuckle. Sadly he had released himself before I got the chance to say 'I told you so' when it would have had most impact.

The point of this missive is to impress upon those of you to whom it has not spontaneously occurred, the great boon it would be, especially if someone else does your washing, if you all wore either an overall or scruffy old clothes whilst about your business. In the meantime does anyone have some good tips on how to remove enamel paint and Cynacrylite glue from clothing which would not result in the clothing spontaneously combusting or causing a very nasty rash the next time the garment was worn?

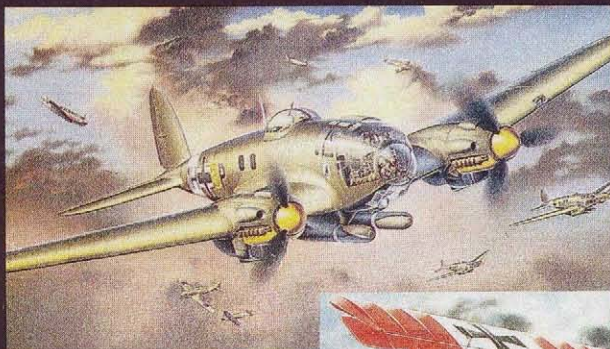


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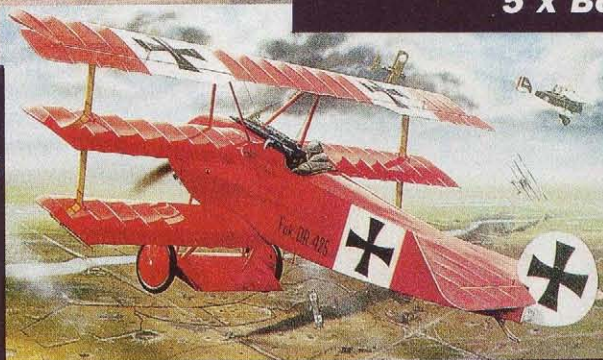
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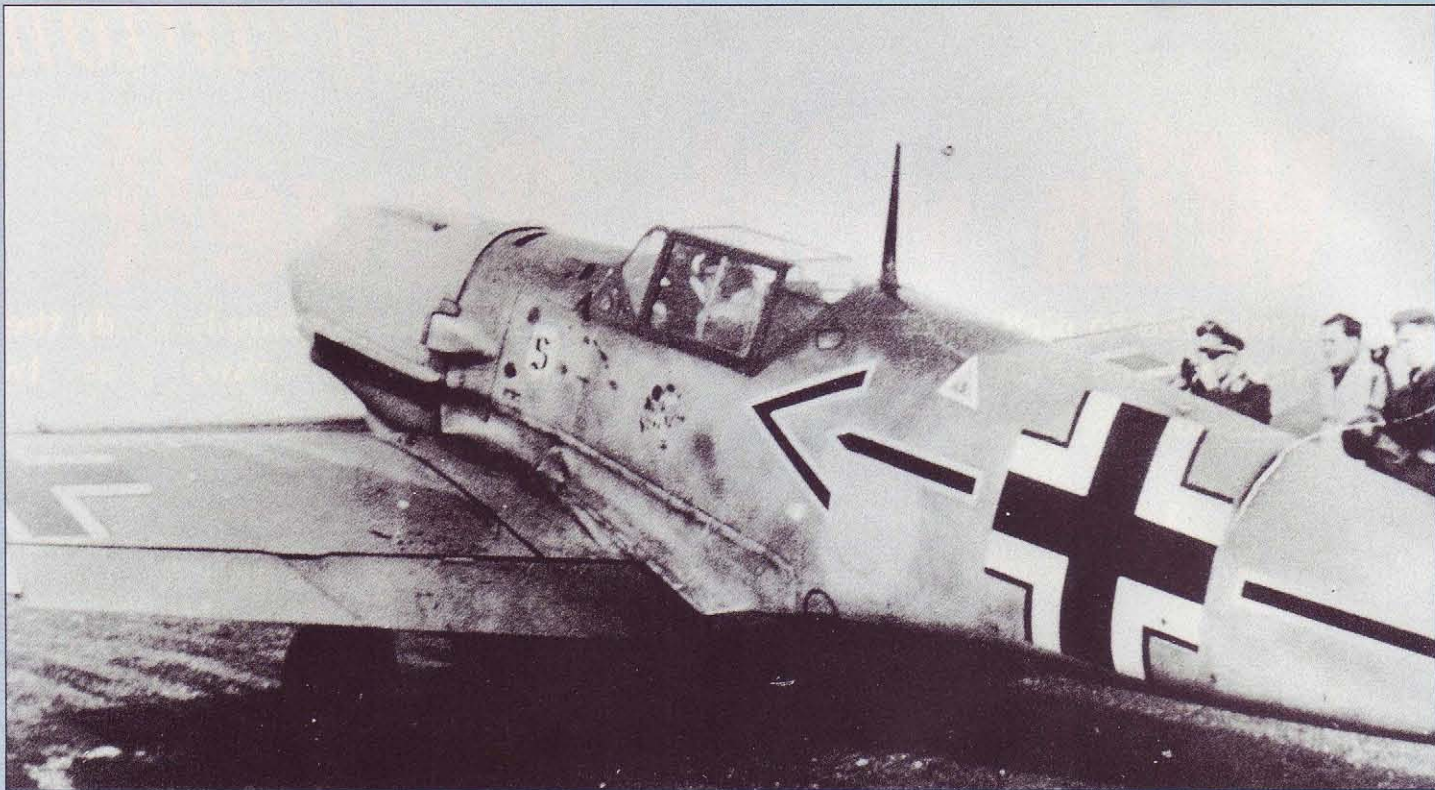
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Number 58 on Adolf Galland's Rudder

Michael Payne

During the summer of 1945, among the numerous interviews, assessments and interrogations which took place between the Allied Intelligence officers and the captured leaders of the defeated Wehrmacht, one of the most productive for the RAF was the examination of Adolf Galland, who had played such an influential role in Luftwaffe affairs throughout almost the entire period of hostilities.

By reading the transcription of his interrogation it is easy to see how Galland made use of his notes when he put together the text of his autobiography in 1953, the book which, translated into English by Mervyn Savill, was published by Methuen & Co two years later under the title *The First and the Last*. In the Foreword which Douglas Bader wrote for it, he says how deeply absorbing he found so much in this book; and this is still true not only for those who flew during the war, but also for those of us who are still trying to put names and details to the bare facts of recorded history.

The story of the war in the air during 1940 has been fully documented and published in so many books, with truth and error committed equally to posterity, but the period which followed, during the spring of 1941, has been far less widely written up.

Through his book Galland tells a number of significant anecdotes. In particular, one such incident is described on pages 103 and 104. It was on 4th April 1941, when Galland was flying from Düsseldorf to take up his new duties of air defence for the naval bases in Brittany, and it had often aroused my own curiosity since the book tells only one side of the story. Strange to tell, the other side of the story was discovered less than five miles from my own doorstep.

On that day in April 1941 Major Galland, the Kommodore of JG 26, was accompanied by Oberfeldwebel Rogert Menge, an experienced wing-man. After refuelling at Le Touquet Galland decided that the two Bf 109s should make a brief, unscheduled sortie across the Straits in search of unsuspect-

Adolf Galland's regular aircraft in early 1941, before he received his first Bf 109F in April. Note the new hatch behind the Winkel. The cameraman on the right bears a likeness to Werner Mölders. (Author's collection)

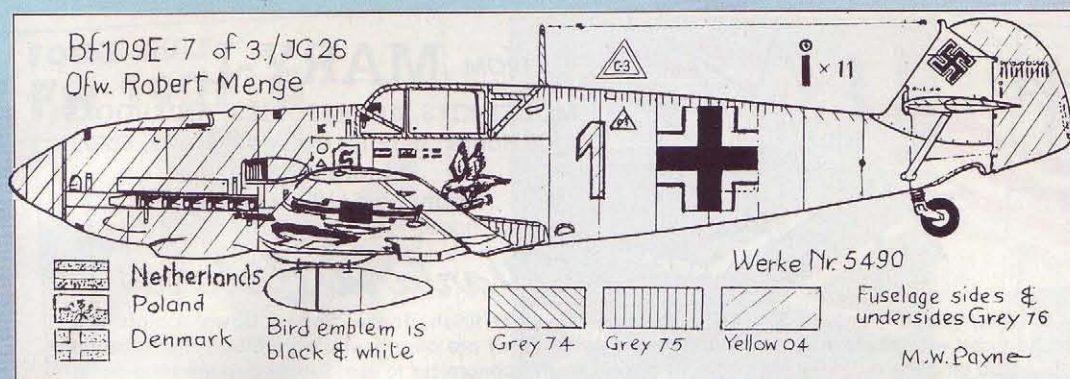
ing RAF aircraft before they proceeded westward to Brest-Guipavas. Galland is not quite correct in his account. Fighter Command did not send up a squadron of Spitfires to intercept the two intruders. In fact they happened upon a pair of unfortunate Spitfire pilots, still climbing at about 5,000 ft on a routine patrol and trying unsuccessfully to gain radio contact with their Sector Station, Biggin Hill. They had received no information and no reply to their messages and were consequently unaware of the presence of enemy aircraft in their patrol area.

Having assured myself that Galland's anecdote concerned the only fighter engagement on that Friday, I came to recall a conversation some years before with a friend from a nearby village, who had been obliged to bale out from his Spitfire when he and a companion had been attacked over Kent. The date had remained in my memory because it reads '4/4/41'. The conclusion was obvious and I asked further questions.

My neighbour, Squadron Leader A W P Spears, had been a Sergeant pilot in 1940 with No. 222 Squadron and then with No. 421 Flight which, in



Sgt Mann's Spitfire P7783 where it crashed in Kent. The individual code letter could be either S or B. Sky spinner and tail band are just discernible (via A Saunders)



January 1941, was expanded to form No. 91 Squadron, equipped with the relatively new Spitfire Mk.IIA. The other Sergeant who flew with Sgt Spears on that day was Jackie Mann, who had joined No. 64 Squadron in July 1940, later serving with No. 92 Squadron before being posted to No. 91 Squadron at Hawkinge. His name, of course, was to become widely known some 50 years later when he lived in Beirut.

After lunch on 4th April, Sgts Spears and Mann were busy making preparations in their Mess for the coming evening when the local police were to be entertained with a darts match and other Mess games. By the Tannoy system they were unexpectedly called upon to fly a patrol which should have been flown by pilots of 'B' Flight, but who had not yet returned from a Gunnery detachment at Sutton Bridge. It was while they were still climbing towards Dover that they were 'bounced' by the two Messerschmitts.

The code letters used by No. 91 Squadron were DL and although neither of the individual letters is known, it has been confirmed that Sgt Spears was flying P7565 and Sgt Mann flying P7783. In the camouflage colours of the period the two Spitfires would have carried the standard upper surface finish of Dark Green and Dark Earth. Their undersurfaces would have been Sky, with the port wings painted Matt Black (Night). The roundels under the port wings had a yellow outer ring, similar to those on fuselage sides. Both aircraft had Sky spinners and tail bands across which the black serial numbers would appear in part. Until about August 1941, code letters remained in Grey.

The finish of the two *Emils* can be assessed from the photographs as being in the 1941 range of greys (RLM 74/75/76) with mottle on fuselage sides, that on Menge's yellow 1 (of 3. Staffel) being the paler. During the winter months the aircraft of the Geschwader had been up-rated mostly to E-7 standard and re-painted or replaced by machines off the production lines. Cowlings and rudders were yellow and although it had been the custom among pilots of the III. Gruppe to record their victory claims in red, those of Galland and Menge seem to have been in black bars.

Photo evidence reveals that Galland's long-serving mount (W.Nr.5819) had been fitted with Ha-Ha-gear – the nitrous oxide 'laughing gas' injection system used to boost engine power over a short emergency period. Robert Menge's *Emil* used C-3 fuel and could carry a drop tank, so it was an E-7. As W.Nr.5490, it had been built in about December 1940 at Wiener Neustadt, one of a small batch of *Emils* between 5470 and 5494 inserted among the newer F-2 production range. Most new-built E-7s were in the 5900 range, but it has been quite firmly established that older sub-types of *Emil* were regularly modified to later standards. It was possible for an E-1 built in 1939, for example, to be found in North Africa in 1941, flying as an E-7(Trop).

Brittany

The airfield at Guipavas lay to the north-east of the port of Brest, set in a landscape highly reminiscent of north Cornwall. Until 30th March it had been occupied by JG 77 who had been in the region since before Christmas, also flying from

Morlaix and Cherbourg-West, which was the small airfield at Querqueville at sea-level on the western edge of the huge port. On Sunday 30th March II. and III./JG 77 set out for Vienna to prepare for action over the Balkans in April and May. From Brittany they staged through Le Mans, Romilly, Nancy, Karlsruhe and Schleissheim. For the few days before JG 26 arrived from Germany, elements of II./JG 2 from Bernay and Beaumontle-Roger used Guipavas.

After disposing of the two Spitfires in a single, diving pass, Galland and Menge set out westwards for Brest, probably landing again for fuel at Cherbourg. Both the Spitfires suffered critical damage. Sgt Spears baled out, wounded in his right arm, while Sgt Mann regained control of P7783 and made a wheels-up landing before the damaged aircraft burst into flames on the ground. He took a snapshot of the scene.

Each German pilot: claimed a victory and added another painted tab on his yellow rudder. It is of course true that two British aircraft were totally destroyed, but at the time of writing each of their young pilots survived more than fifty years of the various hazards of post-war service, and even years of detention as a hostage. Adolf Galland also survives in Germany, but Menge was shot down and killed during one of the RAF fighter sweeps over the Pas de Calais in June 1941.



While a crewman (not in the more usual black overalls) attends to the parachute, Galland appears to be describing his latest success. Note the yellow rudder with its array of victory bars. (Author's collection)

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9057	Gloss Sea Blue FS 15042
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9071	Dk. Gray
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9074	Lt. Blue
Finland WW II	
9080	ID. Yellow
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9082	Lt. Blue
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9091	Navy Gray
9092	Dk. Army Green
9093	Med. Army Green

9094	Earth Brown
9095	Army Gray
9096	A/N Brown Primer
9097	A/N ID. Orange Yellow
France WW II	
9100	Dk. Blue Gray
9101	Lt. Blue Gray
9102	Khaki
9103	Brown
9104	Tan
U.K. WW II	
9110	Dk. Earth
9111	Dk. Green
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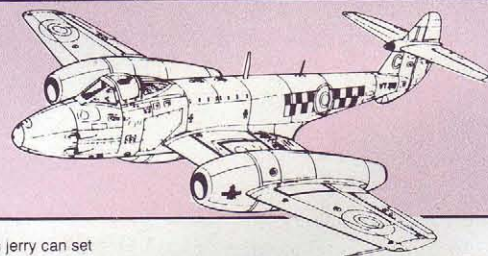
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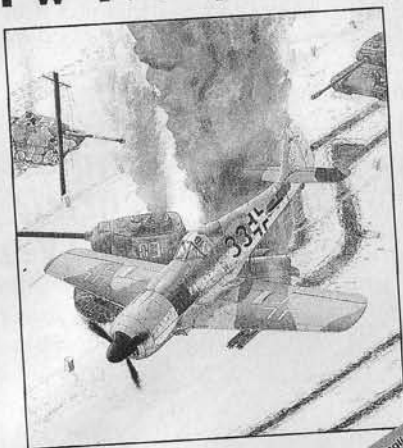
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FOCKE-WULF Fw 190F, G

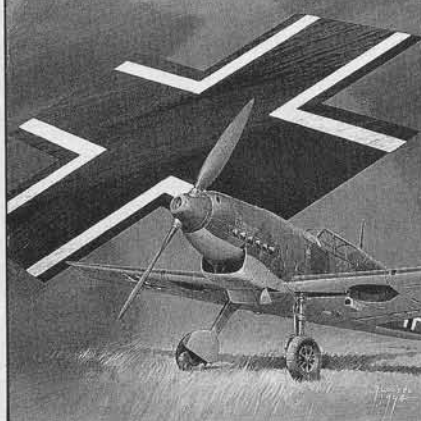


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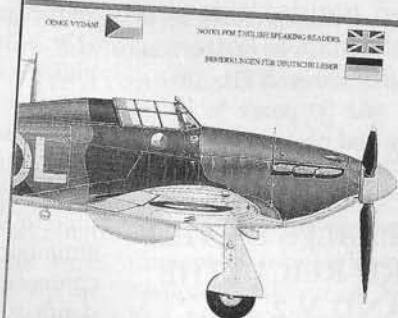
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MODELLING BOOKSHELF

FOCKE-WULF FW 190F, G

Ales Janda and
Tomás Poruba

Published by JaPo and marketed in the United Kingdom by Czech-Six, this 68-page softback is in Czech with an English summary. This should not prove too much of a problem for modellers, as the drawings are clear and captions are given in both Czech and English where they aren't instantly recognizable or where extra information is provided.

The book contains 20 full-colour side views including two of the Mistel, plus 14 pages of black and white line drawings. There's more artwork interspersed within the text, providing excellent material for the super-detailers.

The various types of armament and underwing racks carried by ground-attack Fw 190s are also well drawn. Approximately 50 black and white pictures complement the text – these are also captioned in both languages.

The six-page English translation at the end of the book suffers from bring in a rather small typeface and the English is quaint in places, but it pro-

vides a good summary of the Fw 190F and G series. Not surprisingly, there's a half-page box covering the aircraft in Czech and Slovak skies.

A nice book, well worth its £6.30 price. It's available by mail order from Czech-Six at 48 Station Road, Stoke D'Abernon, Cobham, Surrey KT11 3BN – please add 50 pence to cover postage and packing.

Sue Bushell

LUFTWAFFE 1935-45, CAMOUFLAGE & MARKINGS PART 1

Jaroslav Wrobel

The latest title in the Aircraft Monograph series from the prolific Books International is a long overdue reasonably priced dissertation on the ever-fascinating subject of Luftwaffe camouflage and markings. An A4 softback of 54 information-packed pages, this first part concentrates on the colours and markings used until 1940.

By means of charts, diagrams drawings and superb colour artwork it tells the story from the clandestine beginnings until the Battle of Britain. Diagrams illustrate the different styles of registrations, national markings, lettering, numbers and kill markings –

especially useful charts being the unit identity codes used until the end of 1938 and the special staff aircraft markings used on the Bf 109.

The markings and machines used by the Condor Legion in Spain are covered by drawings and some good photos, while 24 black and white three-views give the official colour schemes for the 16 major types of aircraft in service at the outbreak of World War II. 38 colour views give an excellent impression of some of the non-standard schemes so beloved by modellers.

There are two small errors insofar as Helmut Wick's personal insignia is shown in red and white instead of the correct blue and yellow, and the Bf 109D on page 25 is from IV(N)/JG 2, but these are far outweighed by the sheer amount of otherwise accurate information contained here. Strangely, the captions to several crystal-clear new pictures of pre-war fighters make no mention of the individual names at the base of the undercarriage struts on Heinkel He 51s (p.10) or the individual letters on the fins of Arado Ar 68s (p. 17).

At £7.95 this book compares very favourably with other far

more expensive (and out-of-print) titles dealing with the same subject. Part 2 will cover the early war years until 1942.

Available from Books International or the usual specialist bookshops this publication is highly recommended.

Barry Ketley

HAWKER HURRICANE

Zdenek Pátek
and Jiri Rajlich

Also offered by Czech-Six, this booklet is the eighth in the series produced by Modelpres. A 36-page softback book, it covers the Hurricane from prototype to Mark V and includes the Sea Hurricane – the text is in Czech throughout with captions in three languages: Czech, English and German. There are nine full-colour side views plus full colour cockpit paintings, five-view 1:72nd scale drawings of the Mk.I and Mk.IIC plus a dozen side-views of various marks of Hurricane, and many other detail views ideal for the detailers amongst us.

The pictures – there are 24 black and white shots plus a page of colour close-ups of details – rather let the book down. Although they are all

fine pictures, we've seen many of them before in other publications.

That said, this is an ideal value-for-money book: it retails at £3.90. Hawker Hurricane is available from Czech-Six at 48 Station Road, Stoke D'Abernon, Cobham, Surrey KT11 3BN – please add 50 pence to cover postage and packing.

Sue Bushell

V-MISSILES OF THE THIRD REICH: THE V-1 AND V-2

Dieter Hölsken

Although not a review sample, as this is a book I purchased myself, this new title from Monogram Aviation Publications warrants at least a mention.

The book has been written by Dieter Hölsken. The technical statistics of the book are as follows: 352 pages, hardcover, 450 photographs, 75 colour photographs, 91 illustrations and maps, size 9 by 12 inches (229 x 305 mm), price \$49.95 plus \$5.00 post and packing.

Suffice to say this new title is a must for all people with an interest in all things World War 2 and German. I have had little time to read the title as to yet, although a quick scan of the contents clearly shows the depth of research.

All Monogram Aviation publications can be obtained direct from the publisher at PO Box 223, Sturbridge, Massachusetts 01566, USA.

They accept VISA and Mastercard for payment. Alternatively, you can obtain

copies from Mary-L Models in Bristol, once they have stock.

In 1995 Monogram intends to produce the following titles: *German Aircraft Interior 1935-45, Volume 1*; *The Official Monogram German Aircraft Colour Guide 1935-45, Volume 2*; *Secret Jet Planes of the Third Reich*; *The Projects*. For 1996 the company lists: *Monarch 2: Messerschmitt Me 262, Volume 1*; *German Aircraft Interior 1935-45, Volume 2*; and *The Official Monogram United States Army Air Corps Aircraft Colour Guide 1942-47, Volume 2*.



Richard Franks

Postbag

TSR.2 AND Me 262 UPDATES

Just a short note about a couple of things given in the last issue of *Scale Aviation Modeller*.

First, in Terence Marriott's article on building the Resitech 1:72nd scale TSR.2, he stated that 'the kit does not have any jet pipes' and 'This, really is the Resitech kit's only failing, and looks to have been done only to facilitate casting'. The engines within the TSR.2 are buried deep within the fuselage and the afterburner cans are simple not visible at the outlet. A visit to the Aerospace Museum, Cosford would have confirmed this, as Bill Roseby has recently acquired a complete jet pipe assembly from the RAF Technical College and this is displayed alongside the aircraft, just aft of an Olympus engine. A quick measure and pace out along the aircraft's fuselage would show that the modeller would need to drill

out the rear exhaust areas to a depth of over two inches before you even reached the afterburner assemblies! I know the amount of work that went into the kit, as I have known both members of Resitech for quite a while now. The exhaust area was not done simply to 'facilitate casting', it was because there were little point in adding the exhaust and afterburner assemblies as no one would be able to see them in the finished model without the use of a flashlight.

The second point is with regard to Barry Ketley's article on the Messerschmitt Me 262 and particularly the caption on the top of page 145. The Aerospace Museum, Cosford's Me 262 (W/Nr 112372) is not a composite. Once again a little lack of current research has lead the author to use the assumption made by Phil Butler in his 'Air-Min' booklet. Mr Butler's recent book *War*

Prizes states (on page 88) that 'The reference in the writer's previous book *Air Min* to this aircraft (W/Nr 112372) having acquired the wing of W/Nr 500200, another Me 262 flown by the RAE, has been proved to be incorrect.' Messerschmitt Me 262 W/Nr 500200 (Air-Min 81) is presently intact and stored at the Australian War Memorials, Mitchell Annex in Canberra. It should also be noted that the following Werke Nr allocations are missing from the table on page 144:

Leipzig 113695 to 113728
Schwäbisch Hall 113395 to 113694

The Monogram close-up on the Me 262 states that the name 'Kuno' may well have been a code name for aircraft repaired and recycled at minor production centres such as Lechfeld, Memmingen and Landshut. However, the new book on the Me 262 by Willy Radinger and Walter Schick, show that the 'Kuno I' facility was a forest factory constructed in the 'Justing' forest area near Leipheim. This was an assembly plant which assembled components from the following sources:

— wings from a converted two-level autobahn tunnel near Leonberg in the vicinity of Stuttgart;

- fuselages, supplied by Messerschmitt Regensburg, from the Oberzell dispersed facility near Passau and the Hagelstadt forest works;
- forward fuselage sections came from Günzburg;
- engine cowlings from Lauingen; and
- landing flaps from the town of Wasserburg near Leipheim.

The 'Kuno II' facility was built in the summer and autumn of 1944, east of 'Kuno I', near kilometre 81 on the autobahn.

Finally, the production total quoted on page 145, seem a little different to the ones I have seen. The Monogram close-up on the Me 262 (No.17) states that 'the total number of Werke Nr's issued by March 1945 was 1,948 and that it is known that 1,433 were completed by 19th April 1945, and that almost 500 were destroyed or seriously damaged in air raids thus making the total number of 1,933 aircraft completed by the war's end.' In the Radinger & Schick book the production figure is given as 568 in 1944 and 865 in 1945, this total 1,433. On top of this were 611 damaged or completely lost by allied offensive operations, of which 114 were repaired, therefore giving a

true loss of 497. The total production was therefore either 2,044 or 1,930, depending on which combination of figures you use.

Richard Franks
Bedford

SEA FURY GREY

I'd like to comment on an erroneous statement made by Jonathon Mock, initially in his review of the Tamiya Wildcat in *Scale Aviation Modeller* Vol.1 No.1, and repeated last month in his PP Aeroparts Sea Fury review.

In the Wildcat article Jonathon refers to the 'standard FAA Dark Sea Grey and Dark Slate Grey' scheme and in the Sea Fury article of the 'standard Royal Navy post-war colours of Sky undersides and Dark Sea Grey on top'. I'm sure he must mean *Extra* Dark Sea Grey – the officially laid down colour scheme certainly includes EDSG as being applicable to these two aircraft while in Fleet Air Arm service.

I'm sure that your editorial consultant Ian Huntley will support this viewpoint. He published an article in *Scale Aircraft Modelling* some years ago which clearly gave the colour as Extra Dark Sea Grey, and reproduced an official order from the Admiralty at the time stating the colour as EDSG.

What colours are used by a particular modeller on their models are of course their own business, and I do not subscribe to the view put forward by some that only totally authentic colours should be used on models, but misleading colour references should be avoided in articles.

Dave Burlison
Stevenage

DUNKERQUE INFORMATION

I'd like to add a few corrections to the captions of some of the pictures featured in *Scale Aviation Modeller* Vol.1 No.4.

The aircraft featuring in the bottom picture on page 174 is certainly a Voisin but not a bomber. It is in fact a cannon-armed (37mm Hotchkiss) machine of the type sometimes used as a bomber escort (short

Barnet Model Show is the place to be on Sunday 23rd April when IPMS Barnet hold their annual show at Allum Hall, Allum Lane, Borehamwood. The show is open from 10am until 5pm – further details from Jonathan Burns at 80 Drury Road, West Harrow, Middlesex HA1 4BW.

Watford Scale Model Club holds its annual model show on Sunday 30th April at the

Hotchkiss) or on occasions on anti-submarine work or attacking ground targets (long Hotchkiss). Like other Voisins it has two designations which always confuse. The first is the Military designation which was Voisin IV Ca.2 and the second was the factory designation: Voisin LBS. The 'S' signified two things, the first being that the engine was a Salmson and the second that it was mounted *surélevé*, which means that it was raised above the upper longerons and tilted slightly forward. The Voisin LBP was the factory designation for the 220hp Peugeot engined version.

In the picture on page 175 of the REP, the machine is fitted with two Admiralty Pattern bomb carriers Mk.II under the fuselage. These were capable of accommodating 65, 100 or 112lb bombs. The item on the fuselage side is a lever bomb release mechanism, the other item is not clear enough for identification.

The aircraft in the background of the third picture on page 176 is not a Voisin but a Henry Farman F.27 (all steel) with a pair of carriers under the nacelle.

Harry Woodman
London SW14

FORTHCOMING

Scale Aviation Modeller will advertise forthcoming events in this column free of charge for event organisers who wish us to give advance notice of their shows. Write to the editorial address given on page 221. We'll continue to run your notice until the event is held.

North Orbital Community Centre, Haines Way, North Watford. The show is open from 10.30 until 5pm and there is a modest entry fee of 50p for adults and 25p for children. There'll be competitions, exhibitions, trade stands, a raffle and refreshments. For further information telephone 01582 840879.

Wirral Modelling Club will be holding its third annual Fine Scale Modelling show on the weekend of 7-8th May. The event is being held between 10am and 5pm at the Centenary Stand, Liverpool Football Club, Anfield and is themed to commemorate the anniversary of VE-Day. For further information contact Ian Weir on 0151 639 3636 or Derek Barton on 01942 711550.

The Poole Viking Model Club will hold its annual model show on Saturday, May 13th, at St Mary's Church Hall, Wimborne Road, Poole, Dorset. This event has grown in recent years into one of the major model shows in the south of England. For further details, please contact Club Secretary, John Bothamley, 9 Heather Close, Bournemouth, Dorset. Telephone (0102) 527723 evenings; or Ian Groves, 21 Abbotsbury Road, Broadstone, Poole, Dorset.

Northern Model Expo, jointly organised by the Hull and District Scale Model Club and the Museum of Army Transport in Beverley, is taking place over the weekend of 13 and 14th May 1995 at the museum. Further details from Richard Alsop at 54 Howdale Road, Chestnut Farm, Hull, North Humberside, HU8 9JZ. Telephone 01482 711300.

Modellers in East Anglia (and further afield) should make a

note of the **Norfolk Aviation Society's** annual Model Aircraft Exhibition at the Copeman Centre, Briston (near Melton Constable) on Sunday 21st May. The event is open from 10am to 5pm and will also include sales stands and refreshments – admission is 50p to cover the cost of hiring the centre. For further details contact NAS at 35 Rosebery Road, Suffield Park, Cromer, Norfolk NR27 0BX or telephone Merv on 01263 511257 evenings between 6 and 8pm.

IPMS Tyneside's **Northern Model Show** will be taking place in the Temple Park Centre in South Shields on 3rd and 4th June, a new venue for this established event. There will be competitions galore and the show is open from 10am until 5pm on each day. For further information please contact Paul Williams, 78 Hollywell Road, North Shields, Tyne and Wear NE29 7NQ or Rob Sullivan, 7 West Avenue, Rowlands Gill, Tyne and Wear NE39 1EB.

Ramsgate Model Spectacular will be held at the Jackey Bakers Sportsground on 24th and 25th June 1995. The emphasis is on model flying but there will be a whole host of modelling and pastimes on display. For further details contact Dave or Sheila on 01843 841691 or (Mobile) 0831 546671.

Following the success of its one-day 1994 exhibition and competition, the **North East Modelling Society** will hold its first two-day show on the weekend of 29 and 30th July 1995 at the Borough Hall, Hartlepool. Further details on the show can be obtained from the Secretary at 6 Jude Place, Peterlee, Co Durham SR8 5JW. Telephone number is 0191 586 7139.

DON'T FORGET – back issues of Scale Aviation Modeller are available from the editorial address on page 221 at a cost of £2.20 per copy.
Stocks of Vol.1 No.1 are in short supply so be sure to get your order in quickly!

Readers Classified Advertisements

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COLLECTION FOR SALE. 275 Aircraft, many rare, mainly British, including prototypes and experimentals. For sale in one lot only. SAE for list to Model Museum, Rivington Lodge, Rhonehouse, Castle Douglas, DG7 1SZ.

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CORRESPONDENTS

WORLD WAR II Japanese aircraft modeller wishes to correspond with like-minded modellers. Also requires books, kits (1:72nd only) on same, will buy or exchange at reasonable price – I'm a builder, not a collector. Peter Fearis, 45 Percival Road, Copnor, Portsmouth, Hants PO2 7RX. Telephone 01705 356954.

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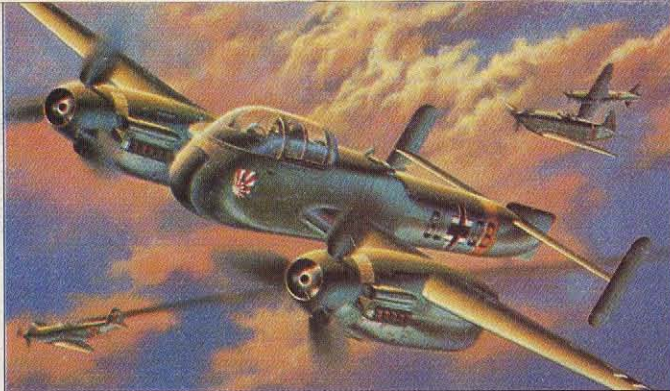
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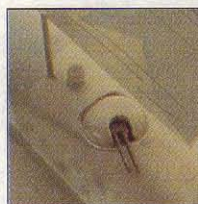
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combat aircraft, a camera compartment was fitted out in the right-hand engine nacelle, fulfilling the photo-reconnaissance role. Despite its advanced design, the Arado 240 never went into full scale production, although several of the prototypes saw limited service in their role of photo-reconnaissance operating over



England and Italy. Several aircraft saw service in Northern Finland with Jagdgeschwader 5 during the Winter and Spring of 1943/44.



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